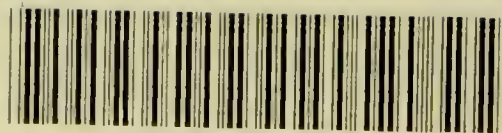


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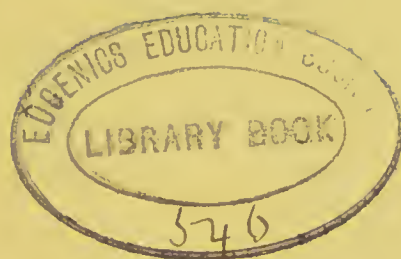
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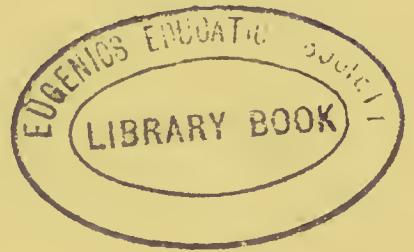
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CHILDHOOD

CHILDHOOD

Its Nature, Nurture, Psychology and
Education in Relation to Social Life



BY

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INTRODUCTORY REMARKS.

IN presenting this work to the public, which was written for Honours in the University of London, the author wishes to state that whilst the bulk of the matter is here, that of a too severely academic character has been removed; and, further, that while the presence of advertisements is a necessary adjunct in the cost of publishing such a book, great care has been exercised in excluding any article which in the opinion of the author is not satisfactory and reliable.

The author wishes here to publicly thank his wife for acting as amanuensis and her care in correcting the proof sheets.

F. D.

FOREWORD

As presented to the University of London.

IN submitting this attempt for Honours, the author feels the inadequacy of treatment in that the matter is necessarily condensed, but would especially draw attention to the chapters upon and influence of—

Mendelism, Malthusianism, Education, and Evolutionary Domestication in relation to "The Social and Industrial History of the nineteenth century."

The whole phenomena sending out thongs running through the general course of Social Human Life.

It is quite possible that I have omitted much that another author would have inserted, and enlarged on points which some might consider as out of place. Be that as it may, I can only hope that what I have written may prove of interest and fulfil the purpose for which it is intended.

With the Author's Compliment

CHILDHOOD.

Its Nature, Nurture, Psychology and Education in Relation to Social Life.

IN dealing with a subject so vast as that of childhood, the bearing of the biological sciences is of such importance that it may be well to take at least a superficial glance at the phenomena leading up to and bearing upon the production of a child.

Every organism, whether vegetable or animal, is the outcome of that fundamental principle or substance which we call protoplasm. Analysis tells us that protoplasm is built up of certain elementary substances: hydrogen, oxygen, nitrogen, carbon, sulphur, phosphorus, together with traces of iron, magnesium, calcium, potassium, and sodium, these ultimate elements being obtained by chemical analysis of the dead jelly-like substances or sarcode material called protoplasm. The chemist may by synthesis prepare a something having all the physical characters of protoplasm, yet cannot endow this mass with life; he cannot convert this protoplasm into bioplasm.

That which we call "life" is the outcome of the physical and chemical processes going on and expressed as physiological functionings in a highly complex and unstable molecule, probably a very large molecule, composed of an immense number of atoms, this physiological functioning being termed metabolism.

It follows from this that every living organism, be it microscopic or macroscopic, has certain peculiarities and definite needs : there are irritability, respiration, excretion and movement, and no living organism can carry on its functions, or, indeed, live at all, unless supplied with water.

There is the period of growth, the period of reproduction, and the period of decay. Although in the lowest forms of life this latter has been denied, owing to the fact of the phenomenon of fission, yet it is really death to the particular individual ; that is, the period of reproduction is the completion of the individual life ; but, in the higher forms of life, individual life and development extend beyond the period of reproduction.

The organism responds to external stimuli and exhibits irritability—that is, it endeavours to adapt itself to its environment ; in fact, life is a continuous adjustment of internal relations to external relations.

The organism is therefore more or less plastic, and the stimuli or forces of the environment mould the organism in a definite manner.

Plasticity may exist without variation ; that is, without a definite environment, the organism dies. This is especially the case in the primary conditions of life, but in the higher conditions plasticity with variation is the rule, be the variation ever so slight.

Changes in temperature, degrees of moisture, light, culture media, or food, produce marked variations, especially with bacteria, for instance ; whilst with higher plants and animals variation is evident upon every side.

In the higher organisms the characteristic mode of reproduction is the growth of a nucleated mass of proto-

plasm, known as a fertilized egg-cell, into a new organism, which resembles, with slight variations, its parents.

It would seem, then, that these specific masses of protoplasm carry in themselves certain characters and powers of development, and by coalescence and growth the new organism will partake partially of the nature and characters of the one parent organism, and partially of the nature of the other. Hence the problem of heredity, hereditary tendencies and inborn characters, arises ; the hereditary tendencies of the offspring varying according to the prepotency of the one or the other parent, that is, in relation to the egg-cell and sperm-cell respectively. Inborn characters of a child, as of other organisms, will therefore be due to heredity. But there is still to be considered the problem of "acquired characters." Weismann denies that acquired characters of the individual are transmitted in any way, and that there are certain characters which have to be acquired anew in each generation ; such is true to a certain extent, but I submit there is distinct evidence that the children of educated parents acquire their knowledge more easily, for the most part, than do the children of uneducated people, and that there is, therefore, a something transmitted in the egg-cell or sperm-cell which influences the structure of the resulting nervous tissues to acquire that which is required the more rapidly.

The children of savages and uncivilized tribes, if taken at birth and educated side by side with Europeans, frequently appear to pick up and assimilate knowledge more rapidly than the children of the whites ; but they go to pieces at puberty.

Again, how is it possible to account for the evolution

of organisms observed in the various geological epochs except by the transmission of acquired characters, unless, indeed, there was a special creation for each, which embryology seems to deny? I admit there are gaps which are not recorded geologically, and the presence of which cannot be filled by embryology; but, all in all, the evolution from the simpler organisms steadily and surely to the more complex is expressive that these characters have been acquired bit by bit, in regular sequence, over æons of time, in response to individual needs and environment.

The development of the frog (*Rana temporaria*) gives us a charming study and example of the matter up to and including the transition period of gill-breathers and lung-breathers, and I may perhaps be pardoned in placing these phases in chronological order.

Development of Frog (Rana temporaria).

Egg	...	...	...	...	Protozoon.
Segmented Egg	...	...	...	...	Colonial Protozoon.
Blastula	...	...	...	...	Volvox.
Gastrula	...	...	...	...	Hydra.
1st Stage	...	...	...	...	Lamprey.
2nd Stage	...	...	...	...	Mud Fish.
3rd Stage	...	...	...	...	Newt (Siren).
4th Stage	...	...	...	...	Newt (Salamander).

Progressing a little further and higher in the scale of animal life we find the Reptilia. Here a new morphological character arises—the amnion, a covering with its contents destined to act as a water cushion for the protection of the contained embryo; then, with further modifications in reptilian characters, we get the parting of the ways. Birds are produced upon the one hand, and

mammals upon the other. So beautifully modified are these mammals to their needs in response to environment, that slowly and unmistakably we trace the development of organs and function from microlestes to man. The study of zoology shows us the steady evolution, whilst palæontology reveals to us the fossilized bones and remains of the varying intermediate organisms, although there are gaps not yet filled in, and probably only remain gaps because we, as scientists, are too ignorant to sufficiently fathom the problem. In any case we must keep clear of the vulgar error of the so-called "missing link." I am bold enough to say there is no missing link, for whilst the lemurs and the anthropoid apes are an approach to man, and the discovery of the Spey skull may be taken for what it is worth, I would suggest the parting of the ways between the higher apes and man occurred in some form of life probably somewhat resembling the gorilla, for if we examine the skull of a baby gorilla and the skull of the human baby, their form, size, texture, and resemblances are identical at birth, but as growth takes place they develop differently, the one with its ultimate central ridge destined to become ape, the other with extended pushed forward frontal lobe—man.

In addition we have the survival of rudimentary organs. In the human body we have the plica semilunaris of the eye, the panniculus carnis of the ear, the vermiform appendix, the coccyx, the thymus gland (large in the infant, but which gradually shrinks and finally disappears), the pineal body, probably a survival of an ancestral reptilian eye, and other vestiges of structures more largely developed and used in ancestral forms.

In dealing with

Human Embryology

we are struck by the fact that all higher metazoa, with certain modifications, appear to pass through well marked and definite phases.

The germ-cell or ovum having been fecundated by absorption of the sperm-cell or spermatozoon, segments and a mass of cells result, closely packed together, termed the morula stage; these separate, giving rise to a central cavity, and is then known as the blastula stage; then this single layer of cells with its central cavity invaginates, forming two layers with a central cavity, now called the gastrula stage, the layers being termed the germinal layers, the outer called the epiblast, the inner the hypoblast, and from this hypoblast another middle layer results—the mesoblast. Later the epiblast gives rise to the central nervous system, to the epidermis, the hair and nails; the mesoblast to the greater part of the body tissues, such as cutis, muscles, bones, and the large glands; and the hypoblast, the epithelium of the intestines and the cells lining the ducts of glands, &c.; notochord, stomodæum and proctodæum result, together with formations of amnion and allantois, from which the placenta foetalis is produced, which applies itself to the placenta uterina, and thus circulation is set up between the mother and foetus. In the meantime vessels are formed and aortic arches develop (apparently the fish stage of embryology). Further modifications for nutrition and respiration occur, and we find aerated and well nourished blood runs from the maternal placenta into that of the foetus along the umbilical vein to the navel entering the body of the foetus, thence to the liver, and further

aerating and nourishing by the system of vessels already formed.

My reasons for so describing these processes is to show that the human foetus evolutes and passes through stages in embryology corresponding more or less with the lower organisms, and that ontogeny appears to be the sum-total of phylogeny. It also shows the general health and nervous state of the mother during pregnancy will materially influence the character of the child.

It follows from this biological sketch that the child pre-natally is, as it were, a condensed epitome of animal life shown in development ; that from cells we get tissues, from tissues organs, and that cells, tissues and organs collectively result in the organism ; indeed, it follows the course of other vertebrates, the vital processes are the same and the laws of heredity and variation are equally applicable ; that the type and plan of structure, the existence of rudimentary organs, are common both to man and mammals ; this physiological development is the recapitulation theory of Haeckel, the result of evolution and embryology.

The child having been born, we are struck by the long period of helpless infancy which the human species exhibits, necessitating parental care and social environment differing from every other form of animal life ; this prolonged infancy acting as the foundation of human family life and eventual civilization.

The child may also be looked upon as the epitome of the race, the past history exemplified by physical atavism generally lost before maturity.

Goethe and Comte have both shown that a comparison may be made in certain points between the growth of the individual and of the race, and that these

are evident during childhood, and are more or less parallel with the phases of primitive and savage life, noted to-day as existing among uncivilized tribes.

The Nurture of Infancy and Childhood.

This great sociological problem, that of the proper care of the human organism during infancy and childhood, is of immense national importance.

I do not propose to show by statistics the large number of deaths which occur during infancy and later child life, because crying over spilt milk is of no avail, but rather to point out briefly the main paths by which these deaths may be obviated; we must therefore approach this matter by way of physiology, anthropology, and psychology.

The infant at birth is practically purely vegetative. Born deaf, unable to distinguish objects by sight, or to properly co-ordinate muscular activities, and the nervous system in a most unstable condition, we have a creature capable of crying vigorously, and grasping with a power which seems inexplicable excepting by way of anthropology; it possesses the instinctive power of clinging, probably a survival instinct from tree-climbing mammalian ancestry, together with another instinct — namely, sucking, instinctive survival from marsupial ancestry. The heart beats rapidly and irregularly, a little water is passed, but the bowels do not act and excrete the meconium derived from the maternal blood-nourishing current during foetal life until the child has sucked the first aperient milk from the mammary glands of the mother. This I look upon as one of the most beautiful instances of Nature's functioning; in a word, the mother naturally provides

the aperient to regulate the bowels and stimulate the peristaltic action of the infant's intestines, and that milk which follows is of a sufficiently nourishing character, under normal conditions, to maintain the life and growth of the developing infant until such time as the teeth begin to be erupted. During the first few days of life the infant loses weight, but this is perfectly natural and need not cause anxiety, after which if the maternal milk is of the proper character, rapid growth takes place. Mother's milk is the natural food, containing everything necessary for the infant's nourishment, growth, and development; therefore, artificial foods should, if possible, be avoided.

If artificial foods must be resorted to, care should be taken that such contain neither raw starch, fibre,* cane or beet sugar; the first two are liable to cause gastric irritation, whilst cane and beet sugars frequently give rise to "thrush," because the young infant is incapable of digesting these sugars, the secretions of the parotid, maxillary, sub-lingual and intestinal glands not yet containing the enzyme for the purpose. Lactose is the proper sugar for infant life. Starchy foods† should not be given until the teeth begin to erupt.

At the age of four months the baby's weight should have doubled, and at twelve months trebled; after this age the increase is less steady and rapid.

One important point too often forgotten or disregarded in connection with infant life is warmth. The surface of the body is great as compared with the mass, hence heat is lost rapidly; the clothing‡ should therefore be light in weight, but warm.

* *Horlick's Malted Milk is very suitable.*

† *Robinson's Patent Barley can be relied upon as being practically free from starch.*

‡ *"Viyella" garments are good.*

It is generally believed that babies grow more rapidly during sleep than at any other time, and we find by experience that infants properly fed spend most of the time during the first nine months of life in sleep.

Sleep, undoubtedly, is of paramount importance, especially for the development and stability of the nervous system, and applies not only to infant but to later life ; but much depends upon where this sleep takes place ; stuffy rooms and vitiated atmosphere are bad, hence it is well for infants, as well as others, to sleep in well-ventilated apartments (free from draughts), or, better still, in the open air, provided the body be kept warm.

Baby therefore should, as far as possible, live in the open air.

Sleep is so essential to growing infant and child life that it may be well to mention the approximate number of hours required at various ages. For instance, a healthy infant at birth until one month old sleeps most of its time, about twenty hours of every twenty-four ; up to six months the average should be eighteen hours ; to twelve months, sixteen hours ; from one to two years, fourteen hours ; from two to six years, twelve hours ; up to ten years, eleven hours ; and to the age of fifteen, about nine hours, preferably ten hours.

The child should be fed at regular intervals of time by the clock, not guessed at ; in fact, the rule is little and often, and if it be necessary to use a bottle, the boat shape is the best, without tube of any kind, thoroughly washed, cleansed and scalded between each feed.

Up to two years, five feeds daily may be looked upon as necessary ; at four years, four meals daily of light, varied and palatable diet : the child's cravings for sweets being met by the addition of sugar and a fairly

free administration of the best chocolate. Later meat may be given twice daily, but in every case, and at every age, the food should be of the most nourishing, containing a fair amount of proteids ; because it is only upon proteids that the child builds muscle and actually grows.

With regard to growth and increase in weight, girls appear to be upon the whole more regular than boys, but any failure to increase or loss of weight should be looked upon with the gravest suspicion, as indicating the onset of serious illness, lack of metabolism, insufficient or improper diet.

Girls and boys run well together in this respect up to the age of eleven years, girls then take the lead and are not overtaken by boys until after the fifteenth year.

The infant at birth has, relatively to the adult, an enormous brain, which continues to grow and increase in size until the eighth year, after which complexity in brain structure begins. The skull is unossified, and the nervous system is unstable, and imperfect in control.

The ear is imperfect, the mastoid is barely present, and the Eustachian tube broader relatively than in the adult.

The nose has a flat bridge, becoming higher subsequently.

The muscles are flabby, and the limbs badly developed.

The kidneys are both the same size, the left subsequently becomes larger.

The marrow of bone is very vascular and oily.

The liver is very large, as compared with bodily size, both in infants and children, and as a whole the glandular system is very deficient, and the battle of the glands

between childhood and adolescence is one of the most critical periods of human life.

The lymphatics are well developed.

The heart is small and the arterial system large, hence the blood-pressure is comparatively low.

The circulatory system varies more than any other, and the blood itself, which may be looked upon as a connective tissue, has a lesser specific gravity than in adult life, and less fibrine ferment, which means that the drawn blood of a child will not coagulate as easily or so rapidly as in adult life. This, I take it, is Nature's adjustment relative to blood-pressure previously mentioned. Lymphocytes and phagocytes are less in infant and child blood than in adult life, hence during childhood there is a greater liability to zymotic diseases.

The growth stress and the power of muscular co-ordination alters the bend of the spine from child to adult life by the pull of the muscles; careful and well-planned physical exercises are therefore of the greatest importance for the development of beauty of form and muscular contour.

The lungs, with shape and chest capacity, cannot be overrated, and necessitate rightful methods of breathing, especially to fill the apex of each lung, the part too often practically dormant and insufficiently developed. The lungs increase twenty-fold from infancy to adolescence, and chest capacity and weight generally go together.

These physiological differences between infant, child and adult life must persistently and consistently be borne in mind during the nurture and training of the child both physically and morally, and, moreover, that no child is capable of sustained continuous effort, either physically

or psychically, and therefore in education lessons should be "short and sharp." There are also certain "fatigue periods" in child evolution which appear to correspond to, or have parallelism with, certain racial traits which require careful handling at the times when they arise; these may be looked upon as "Landmarks in Life," and may be termed

PHYSIOLOGICAL PERIODS.

(1) The first nine months of life are practically vegetative; indeed the baby is passive. This phase is followed by the

(2) Second period up to four years, in which the child becomes aggressive, with changes in anatomy, muscular movements unco-ordinated, and the sensory side in advance of the motor; later

(3) From five to twelve years, in which experience is being obtained; from five to eight years chiefly by play, the eighth year becoming a fatigue period with general lassitude, to be followed from nine to twelve by a working phase; it is at this time education should be advanced and discipline exercised.

(4) At twelve years of age, or thereabouts, another "fatigue period" exhibits itself, and

(5) Youth arises when, physiologically and mentally, a great upheaval occurs with reconstruction anatomically and socially.

The age of eight years is a serious period in child life, second dentition is taking place, and the child requires recreation and rest to obviate the terrible consequences of nervous breakdown.

For the physiological periods of the whole of human life I may perhaps be permitted to suggest the following:—

- (1) First dentition and early childhood.
- (2) Seven to fourteen years—second childhood.
- (3) Fourteen to twenty-one years—adolescence.
- (4) Twenty-one to twenty-eight years—youth.
- (5) Twenty-eight to fifty years—manhood.
- (6) A period apparently stationary resulting in
- (7) A steady decline physically and in the uneducated mentally, but with the educated the mental powers frequently abide to the last.

It is apparent, therefore, nutrition is dependent on many factors, most of which may be controlled.

Indications of good nutrition and nurture are evident in the personal appearance of the child, activities and posture, examinations of the vital organs and comparison of weight, relatively to age and height.

In poor nutrition and nurture, and faulty environment, the child is listless and pallid, with decayed teeth and scanty dull hair, deficient in height and weight, posture bad, with activities at a low ebb.

The essential points and conditions to obtain the best results are:—

- (1) Good suitable food.
- (2) Abundance of sleep.
- (3) Fresh air.
- (4) Warm light clothing.
- (5) Cleanliness.

Concurrently with bodily growth, muscular co-ordination and activities, with the many physiological functionings, we have to consider the nervous phenomena of the organism, the sensory development of the child, the gaining of experience, and results of environment upon the nervous system in the development of mind. How do the child psychoses arise and what

connection has the body and mind with general nutrition?

As a rule we may expect, unless hereditary tendencies are wrong, that the well-nourished body will develop a healthy mind—indeed, that mind activities are dependent in a great measure upon the bodily state of the individual; it is our duty, therefore, socially to strive in the first place to make good animals, by which means, with proper environment and suitable education, we build up a social entity which, by contact and interactions with others of like characters, is a credit to the nation.

Let us look briefly and yet in a sufficient manner at the developing mind of the child. At birth the organism is chiefly vegetative, possessed of the natural instincts to suck and to cling, and if placed upon the teat will suck until hunger be satisfied and will endeavour to cling by grasping with its fingers; so far this is purely instinctive, but the infant is developing the sense of touch and the power of muscular co-ordination. Later an endeavour is made not only to touch but to see the haven of desire, and to co-ordinate the muscles of the body in getting at it, so that for the first nine months of life the infant is mainly occupied in muscular co-ordination and in learning to see and touch, getting gradual but increased command over the tactual and visual sensations; in fact, mind has begun. We have that which may be termed psychophysical parallelism; the bodily needs stimulate psychic processes, they run concurrently, the instinctive process has become, as it were, a perceptual process; the organism is the better for it, from its previous objective state it has become subjective; there is a

pleasure-pain value, a tendency to adopt that which is gratifying and to reject that which is not gratifying or which causes pain, a satisfaction value is in evidence, apperception is achieved. The child now, placed upon the floor or ground, begins to crawl; this is a most important time of mind development, because physiologically we know the speech centre of the brain and the motor areas correspond in the two hemispheres.

This crawling period greatly enlarges both the physical and psychical experience of the child, and unfortunately many mothers unduly hasten this stage in their anxiety to make the infant walk as soon as possible, in this way upsetting the speech centre, doing the child incalculable harm in mental development.

The child shortly endeavours to give expression to its feelings in terms other than that of crying, and babbling commences; but at this period words are not understood, the tone and inflection of the voice are appreciated by the child much in the same manner as with the lower animals, *e.g.*, the dog. Later an effort is made to name objects which attract the child's attention; frequently a sound quite foreign to the real name of the article is coined and used by the child for its own purposes; whilst designating a living creature by the sounds it makes is quite common to children and is known as onomatopœia.

The child throws considerable light upon racial developments of speech by its peculiar linguistic efforts, another proof in the chain of evidence that the child is the epitome of the race.

At this period of child life, and subsequently, we observe the arrival of the curious phenomena, the fears of childhood, which are mentioned later in this work;

they may be looked upon as instinct emotions, and have been classified by Dr. Stanley Hall in three categories :—

(1) The fear of strange objects.

(2) The fears of space, fire, darkness and the like, which may be looked upon as atavisms.

(3) Fears produced by the imagination, in which monsters, &c., are conjured up.

Concurrently with the fears a series of what may be termed “aggressive atavism” is developed, such as anger, pushing, butting, stamping, scratching, biting, &c., useful perhaps racially in the struggle for existence.

These instinct-emotions have a decided value to the child as a growing and developing organism, by which the individual is enabled to adjust itself and set a certain value upon its environment, really methods of gaining experience in dealing with circumstances of later life.

The child in these matters should be treated with the greatest consideration, especially regarding “Fears.” Kindly treatment, with soothing explanations to pacify these instinctive terrors, should be the aim of the child’s guardian, thus preventing ultra shock to the nervous system until this period of childhood be passed.

PLAY AND ITS SIGNIFICANCE IN CHILD LIFE.

THE instinct for play which we find in all healthy and normal children is of the greatest importance to the individual and to the race. The chief characteristic is its distinction from work, yet much good work may be done by play as the medium.

Play in childhood appears to be first imitative, and secondly experimental. All play is of a simulative character of more serious activities of pleasurable value to the player.

Art, for instance, may be looked upon as a joy in creating a representation of pleasurable value, either expressed as drawing, painting, sculpture or drama, whilst artistic activities achieve work of æsthetic value representing the state of culture of the individual and of the time at which produced; this latter statement, however, is not strictly accurate, because the individual production may be in advance of the time; in this way progress is maintained.

The interpretations placed upon the play instinct by various authors are many, the most important being, in my opinion: firstly, an expenditure of accumulated surplus energy not required for the more serious activities of life; secondly, natural instinct preparing the organism for the subsequent more serious duties and activities of life; thirdly, of an atavistic character showing stages in animal and human evolution.

It is probable all of these theories contribute their share in the play instinct, but it would appear that of preparation for the more serious duties of life is the most important ; but whatever the activity may be, we find it a means of gaining experience, the little girl with her doll or the boy hunting, fishing or fighting, as the case may be. Play to the child is an instinctive interest in experimenting with the objects, real and abstract, of its environment. Play is of the greatest educational value and should be taken full advantage of in teaching and educating the young, adaptation being made to environment ; indeed, improvement or degeneration depends in every case upon environment.

Society is the birthplace of moral feeling. The importance of environment and society to the proper development of childhood in play cannot be over-estimated ; this is the more evident when we remember intelligence is a plastic factor, and varied conditions need plasticity. In all play there is sympathy which leads to imitation always due to gregariousness. Biologically play has a distinct survival value, and psychologically, a satisfaction value leading to physiological improvement, physical development, and good moral tone, giving rise to tradition by adaptation. Imitation in play, therefore, leads into new fields, psychologically into the ideational sphere which is the only stepping-stone to originality.

Much of the play of children may be traced by way of mythology to folk-music and folk-dance ; indeed, folklore crops up at every turn ; for instance, such an amusement as " Scratch Cradle " is a survival. In play there is transmission, both organic and social, forming material of education of value and significance in fairy tales and

the imaginings of the bards of Wales, Scotland, India, and mediæval minstrels.

In this way play makes the individual as, in fact, Society makes man and not man Society.

The forms of play and the varying games calculated to increase growth and developments in child life of different ages, are broadly the following:—

Babyhood.—From one to three years :

Picking, dropping sand, rolling, pushing, splashing.

Early Childhood.—From three to eight years :

Blocks, running, climbing, cutting, swinging, toy machinery.

Childhood.—From eight to thirteen years :

Make-believe play, dolls and toys, hide and seek, marbles, tag, rowing, cycling, swimming.

Advanced Childhood and Adolescence. — Dancing, cricket, football, hockey, tennis, card and table games, and games of chance.

It will again be noticed that even the play of childhood seems to have an analogy or parallelism with the development of Society as we Europeans know it : babyhood and early childhood being the age of individual play ; that of childhood the age of emulation and the beginning of competition ; that of later life the age of co-operation.

We thus see plainly the play of the individual runs concurrently with the development and phases of Society, that by individual effort, emulation, competition and co-operation the individual is perfected, and Society was built up, and further that Society may be looked upon as an organism still evolving.

Play in childhood is a period of spontaneous experiment resulting in pleasure, gratification and imagination,

developing the motor nerve-cells, exercising the emotions and training the senses ; in fact, the playground is the child's social school. Games should be so organized for the child that they become corrective and disciplinarian rather than remedial.

The Greeks and Romans both took advantage of the play instinct in their sports and games, in educational and ethical principles, in making good citizens, for knighthood and war.

Our own physical education in play has been based upon these models ; in 1860 a great revival took place which has steadily progressed up to the present day. Play, physical culture and education is socialization in terms of evolution of the nervous system ; there must be growth, then development ; physical education, then physical culture.

Play for the child must be organized for sensory education, then muscular growth, and finally endurance and skill.

DISEASES OF CHILDREN IN RELATION TO EDUCATIVE SOCIALIZATION.

IN considering this portion of the subject of child life it is not my intention to deal with zymotic and all diseases to which a child is liable, but to consider especially those deviations from the normal due to heredity and constitutional causes, and before we can satisfactorily accomplish this, it becomes necessary to know something of the "History of the Nervous System." Any good work upon Human Physiology explains the general morphology, and in part the functionings of nerve-tissues and the brain, the perfect and harmonious action of which is essential for the full and proper education of the child.

It will be sufficient, therefore, for present purposes to bear in mind that nerve-cells may be either unconscious or conscious, and that the Hughlings Jackson levels of nerve functionings are three, namely :—

Reflex action : Lowest level.

Lower brain : Middle level.

Higher brain : Highest level.

The fuller consideration of these levels of nerve activities will be dealt with under the section Psychology of Childhood, and, incidentally, Education.

The child at birth, if normal, has the nerve-cells of the levels mentioned morphologically present, but pre-natally only those of the lowest level, mainly reflex, activities have functioned; but the moment the child is

born, the nerve-cells of the middle level begin to develop and consciousness arises. (Care must be taken to distinguish between growth and development.)

The structure of nerve-cells is dependent upon the extent of work to which put ; the nerve-cells of the child quickly fatigue, and therefore plenty of sleep is necessary whilst nerve-fibres are growing and dendrons developing. Fat is essential in nerve-fibres, otherwise rapid degeneration of the fibre occurs, and the mental processes of the child suffer in consequence. It will be remembered lecithin was previously mentioned, and it is to this substance reference is now made.

The structure of nerve-cells is due to heredity ; but further development is controlled by environment in terms of nutrition and training, and by these factors of heredity and environment we get the physiological variations upon the one hand, and the pathological variations upon the other.

The child for the first fourteen days of its life does not apperceive, although consciousness is present, yet no pronounced consciousness is evident until about the sixth week ; at ten months the child babbles ; twelve months, echolalia period is in evidence ; third year, the pictorial proclivities of the child are assumed, probably corresponding to the drawing epochs of primitive man ; and at six years the child is active in endeavouring to write ; at this stage "mirror-writing" and a little later "mirror-reading" is a phase the true significance of which is not fully understood, usually very transient with the normal child ; it may perhaps be explained as something to do with Mongolian evolution—Asiatic language writings being to this day read backwards—as compared with Europeans. If such is the true explana-

tion, the inference would be that Europeans have evolved in some way from Asiatics or a common ancestor, and may be not only of anthropological and ethnological interest, but also of philological importance. In any case, in child life the phenomenon is of no educational interest if transient as in the normal child, excepting that everything has a muscular memory storehouse in the brain, nothing is lost.

A child persisting in echolalia is mentally defective, and never likely to improve ; the outlook is bad in every way, educative and social.

For educative purposes the presence of a squint (strabismus) in child life is of no moment whatever, but corrective treatment either by operation or spectacles should be employed in the interest of subsequent appearances.

The shape of the head, whether broad or long—that is brachy or dolichocephalic—is not of importance, but a very small head or a very large head are serious defects with a child ; for instance, if the head at eighteen months old is below 18 in. in circumference we have the microcephalic, and difficulties, if nothing more serious, will arise in education and mental defects become apparent ; upon the other hand, a very large head is not evidence of good mental calibre, but hydrocephalicisms, in which the ventricles of the brain are enlarged and carry excessive quantities of liquid, generally account for the macrocephalic condition ; such children usually have staring eyes.

Microcephalism runs in families among mental defectives.

For educative purposes a suspected mentally defective child should be examined by the medical expert

in the presence of the parents, the teacher of the child should be present also. If the child has attained the age of nine years, and is still in Standard I. of the present educational code, an examination should be made.

A cruel child is generally mentally defective.

With younger children the capability of following a moving object with the eyes, the eyes moving (not the head moving) is a good sign of attention, and as such the child is probably normal; but there may be still defects present either with eyes, ears, palate, teeth, curved "little" fingers, want of volition, termed simple amentia, in which the frontal lobe of the brain is small; the happy little individual, generally a boy with a perpetual smile and pleasant manners, known as "smilers," these are educationally hopeless; again, there is the Mongolian type, good imitators but very little "common-sense"; and yet again there are the cretins, more or less harmless idiots with defective thyroid glands, thick skin, coarse hair and spade-like fingers; proper administration of thyroid extract, together with extract of the pituitary body, improves matters with this type very materially, proving the action physiologically of hormones in the growing and developing child; the disease known as myx-ædema is also relieved by injection of thyroid extract.

Over activity in secreting of the thyroid gland is the cause of exophthalmic goitre.

Short sight—myopia—is a frequent cause of trouble in education of children, and as a rule all young children, from lack of experience, hold books, needlework, &c., too near the eyes; such actions should be corrected at once by the teacher. The child's eyes respond to accommodation very accurately if proper instructions be given and much trouble may be obviated in this way.

Blindness in infants is of rare occurrence ; but if present may be at once detected by the dilated pupil, light having no action upon the iris.

Deafness, total or partial, is one of the greatest drawbacks in child life ; the one thing to be done is to educate as early and quickly as possible.

A cleft palate is a serious defect, and very little can be done to obviate or mitigate the effects in articulation, the main points being to keep the mouth and posterior nares clean, and thus prevent inflammation extending to the Eustachian tubes and ears.

Defects in ears, eyes and palate are quite common in our schools, as medical inspection proves, but adenoids run rampant in every class of society, the education of children suffering greatly as a result of these growths. There is only one thing to be done, namely, remove the growths ; they exist at the back of the nose, and by some means press upon the base of the skull, through which a secretion is said to be absorbed.

The child suffering with adenoids breathes by way of the mouth, is dull and unable to learn upon some occasions, which are very frequent, and apparently mentally normal upon others. The hearing is always impaired, the mouth open, and the child has a tired, vacant look. Until 1890 nothing had been done for this disease of aprosexia, but in 1893 a Commission was appointed, and in 1899 a special Act passed for the benefit of school children.

MEDICAL INSPECTION.

It appears to me, I may be wrong, these growths of lymphatic tissue are really an atavism of marsupial

origin, in which we know flaps are formed behind the nose to assist the young in breathing whilst hanging and sucking at the breast. I am not aware this theory has been advanced before, and perchance there is no truth in it.

Tubercle, the scourge of white races, is common in children in many forms; is "catching," and due to the *Bacillus tuberculosis*. This disease was formerly thought to be due to heredity, but such is not the case, the fact being hereditary tendencies make the organism—i.e., the child—a suitable nidus for the bacilli to develop. The discharge from open tubercular glands in the neck and groins, the expectoration from phthisical patients, and even the breath in some cases acting as the source of infection to others.

Infected children should be segregated.

Meningitis, really a form of consumption of the lining membrane of the brain, and so-called consumption of the bowels, are all phases of the same disease, in which the presence of the bacillus may be proven by staining with methylene blue, or carbol-fuchsine, and examining microscopically.

"Fits" in infancy and childhood tend to repeat in after life, in fact become a matter of steady degeneration, and all forms of epilepsy—the *petit mal* of the French—falling sickness, &c., should be sent to fresh country air and surroundings.

Special schools under the best possible conditions should be provided for all mentally defective; in after life these people should be segregated and their actions checked. By taking finger prints of such, very little trouble would be experienced in again knowing them.

We find in educating the young, and, indeed, with

adults, that certain individuals suffer from aphasia, word blindness, word deafness, or perchance a combination of all these ; such diseases seem altogether inexplicable until we study the analysis of brain functionings, and then we are brought face to face with the fact that certain areas of the brain control and are concerned in carrying on specific work, and receiving definite impressions, *i.e.*, muscular memories.

A proper knowledge of the area of the brain, therefore, is of the greatest importance in locating defects, and the subsequent curative treatment.

A sketch of the brain is of more value to indicate these motor areas than verbiage, but it may be well to mention that :—

(1) Broca's convolution is the speech and articulation centre.

(2) Frontal lobes are the "silent" lobes. Second frontal lobe, written words.

(3) Middle lobes, *i.e.*, around Rolando fissure, is the motor area.

(4) Occipital lobe, chiefly vision.

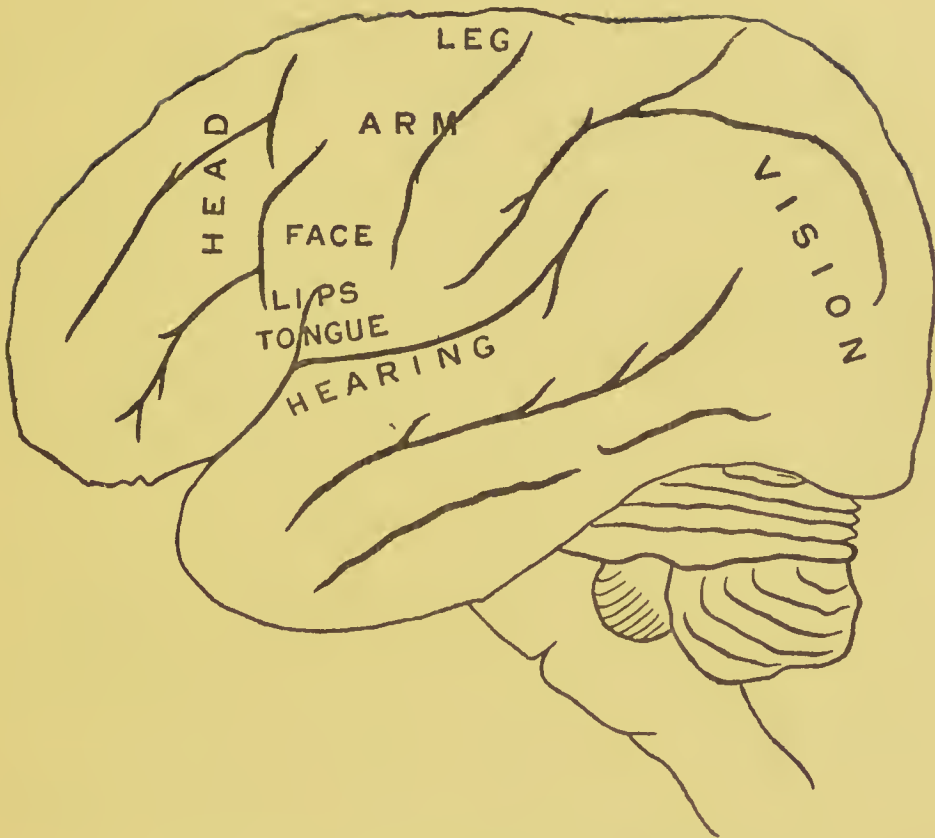
(5) First temporal lobe, words are heard.

(6) Temporal lobe is the auditory centre.

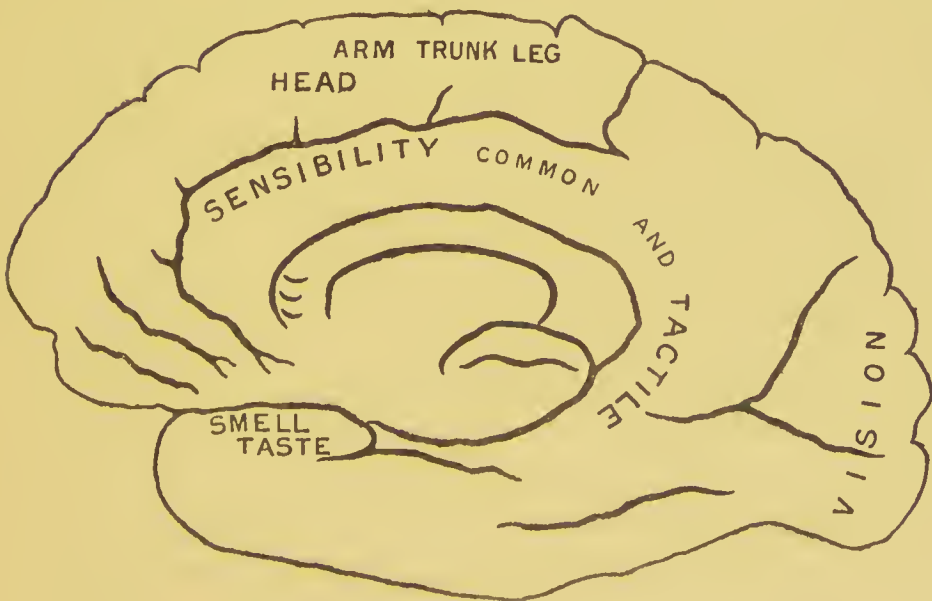
(7) Angular gyrus—word blind, half vision, &c., and injury to this part means failure in apperception of words.

Injury to the motor areas of the brain upon both sides means paralysis of the limbs or organs controlled by the injured area ; injury to one side of the cerebrum means paralysis upon the opposite side of the body, hemiplegia and hemianæsthesia, in so far as the injury extends.

It has been mentioned elsewhere that in the develop-



Human Brain—*Lateral aspect of Left Hemisphere.*
CORTICAL LOCALIZATION OF FUNCTION.



Human Brain—*Mesial aspect of Right Hemisphere.*
CORTICAL LOCALIZATION OF FUNCTION.

ing infant mothers frequently do incalculable harm to the speech centre by placing the child upon its feet too soon in teaching to walk.

(See illustrations.)

Especial interest attaches to the third frontal convolution on the left side, as injury to this part, known as Broca's convolution, means loss of the power of speech or motor aphasia, and in most people who are right-handed the corresponding portion upon the right side remains uneducated or dormant. Is this an argument in favour of ambidexterity?

In motor aphasia there is no loss of voice, but the power of writing the words generally is also lost.

In sensory aphasia the patient is unable to recognize either spoken or written words, the former termed "word-deafness," the latter "word-blindness."

It is an established fact that neuropathic parents produce neuropathic children.

THE REFLEX-ARC IN RELATION TO CHILD LIFE.

THE reflex-arc physiologically and psychologically are not quite comparable.

Reflex action, in the physiological sense, is confined to the response of the spinal nerves to the stimulus received, unregulated by the higher brain or will, but psychologically this reflex action may be greatly regulated, modified or checked by the will.

In every case, however, reflex action by way of the reflex arc is dependent upon the functioning of nerve-cells and tissues, neurons and dendrons. This nervous action may be looked upon as a stimulus received by an afferent nerve-ending conducted to the nerve centre or ganglion, and there converted and conducted by the efferent nerve into a motor response.

It is a curious fact, physiologically evidenced in embryology, that all nervous structures are developed by and from epidermal cells, forming tissues which are tucked in from the outside—inwards, proving that really the biological significance appears to be for the safety and response to environment for the organism in question, in a word adaptation. We can prove this by studying the embryology of amphioxus, or the tucking in of the neural folds seen in the developing chick; the development of the human eye is further evident in the tucking in of the retinal layer,

and its further complications from epidermal tissue, the organs for the sense of hearing and taste are no exceptions to this rule, as indeed the stomodæum and proctodæum are merely the tucking in of the two ends of the developing organism.

In man, however, the mass of nerve tissue, has so greatly developed in response to environment that the portion termed the cerebrum now overlaps, by having pushed upwards and forwards, the mouth or entrance to the vegetative structures, slung as it were in the cœlom ; so that we have virtually two tubes, the neural posterior, the vegetative anterior.

We may, therefore, look upon reflex action in man as being controlled by :—

Firstly, spinal nerves.

Secondly, cerebellum.

Thirdly, cerebrum.

The spinal nerves regulate for the most part response to vegetative functioning.

The cerebellum acts more or less in muscular activities in balancing the organism, whilst the cerebrum organizes, restrains and modifies the higher functionings, such as those of mind, thought and reasonings—in plain language, intellect ; in addition to exercising by way of will certain vegetative phenomena. Yet upon certain portions of the organism the will has no power whatever ; I refer to unstriated or involuntary muscles, such, for example, as the peristaltic action of the intestines, or the rhythmic contractions and expansions of the excised heart ; it is true that in the living organism the systole and diastole of the heart are more or less influenced by the vagus, but this does not affect the argument. The

vagus arises in the fourth ventricle of the medulla oblongata, which in its turn, is in close contact and under the direct influence of the cerebral hemispheres. Destroy the medulla and you destroy life at once, respiration ceases and death is inevitable.

The senses proper are regulated by the cerebral hemispheres and the cranial nerves, whilst certain so-called motor areas influence the various motor activities. The cranial nerves are:—

- | | |
|------------------|--------------------------------|
| (1) Olfactory. | (7) Facial. |
| (2) Optic. | (8) Auditory. |
| (3) Motor oculi. | (9) Glossopharyngeal. |
| (4) Trochlear. | (10) Pneumogastric. |
| (5) Trigemini. | (11) Hypoglossal, whilst |
| (6) Abductors. | (12) Is really a spinal nerve. |

The right cerebral hemisphere regulates for the most part the activities of the left side of the body, and *vice versa*.

We may, therefore, look upon the cerebral hemispheres, and especially the palisade cells of the cortex and the fibres lying beneath, as the seat of human emotions and intelligence; remove these lobes without injury to the medulla—bit by bit—the organism continues to live, but experiences neither pleasure nor pain, merely carrying on the vegetative functionings. A dog with the hemispheres removed, although living for years, shows no sign of pleasure at the approach of its master, eats when food is placed in its mouth, but does not take food of its own accord, &c. A pigeon under similar conditions acts in the same way with regard to food; it will starve standing upon a heap of corn, and if the bird be thrown up will continue to

fly until it falls with exhaustion, &c. Yet a collie bitch with the hemispheres removed fed her pups, most pathetically proving the instinctive nature and character of motherhood.

THE FACULTY PSYCHOLOGY IN THE DEVELOPING CHILD MIND.

THE faculty psychology is, I take it, the working of nerve matter and mind in terms of experience ; but what mind or soul is I fail entirely to understand. I make this bold statement at the commencement because I should like to endeavour to explain later what these abstract things actually are.

It appears evident at the outset that the workings of nerve matter, as evidenced in mind, must be due to experience and the necessary response to environment ; in fact, we have an evolution of mind due on the one hand to hereditary tendencies, and upon the other to response to circumstances or surroundings ; it is in part a response to a stimulus in each case, but this alone would not of itself be sufficient in terms of psychology, for such a statement would be equally true of chemiotaxis, reflex actions, and instincts of the lower organisms.

What, then, is mind ? I would submit will is intimately wrapped up with mind ; indeed, that will is the strongest intention of the mind, and that mind is the outcome of the response to stimuli upon the cerebral cells of the cortex, modified by hereditary tendencies, and experienced by particular environments.

Thought, then, becomes the result of arrested nervous action, only taking place in the pyramidal cells of the cortex of the brain, and mind is only conceivable in terms of thought, and soul becomes the moral status of the mind or thoughts, and if these

thoughts give rise to actions we have the moral or the immoral person, as the case may be, in connection with the peoples or environment in which the person finds himself; therefore a person may be moral, or "good soul," in one community, or positively unmoral in another, owing to ignorance of the customs of those people. This leads us to the question of Ethics. I submit, therefore, Ethics as a study is dependent upon the psychoses of mind; these in turn are dependent upon the customs and training of the people. Upon customs morals are built up, and from morals the various religions have arisen; it behoves us, therefore, not to be cramped and narrow-minded, but tolerant of the opinions of others.

The lower animals have no religions, but they have their codes of morals.

Man is pleased to dub the lower animals—he considering himself the highest animal, the summit of perfection! (or imperfection)—in one of several categories, labelling them respectively: (1) Chemiotaxic; (2) instinctive; (3) perceptive; and (4) conceptive. This latter category including himself with his ideas, puny and otherwise.

I would suggest that probably a sarcode mass, such as amœba, gromnia, or paramœcium, is really much more complex both in structure and psychic functioning than man imagines.

Most men estimate other people's knowledge by their own ignorance, putting evil constructions upon good intentions of their *confrères*, &c.; in plain language they have narrow and cramped psychoses.

During child-life it behoves us therefore to instil breadth of mind in a large environment.

PSYCHOPHYSICAL PARALLELISM AND MIND.

THE practical consequences of accepting psychophysical parallelism is peculiar, in that it lands one into the position of not knowing quite where we are ; I mean this, if this occasionalism is to be accepted in its entirety, I submit we are reduced to certain phenomena which cannot conveniently, in logical sequence, be explained away,

We have the Substance, the Soul, and the Supreme Being *i.e.*, the *tertium quid*, but if function is wrapped up and dependent upon matter in compliance with the laws of conservation of energy, and that energy is, like matter, indestructible, merely changing its state, there is no room for soul or mind in the process, excepting as the guiding agents ; hence mind must be a separate entity, but if mind has no substance, it cannot, in terms of conservation of energy, exist, yet we know by experience there is a something we call mind.

Mind, by these premises, becomes the result of the functioning of matter ; but it has been said :—

“ Life is mind.”

What, then, is life? Here we have phenomena which no man can explain. Whence is it? Why this so-called life at all? The further we go the greater the quagmire ; we have to confess ourselves beaten, we cannot define it ; and Charlton Bastian's radiobes are not in it. It appears to me, as with chemical action, we can only express the final results in terms of an equation ; we cannot state, indeed we do not know, what changes

may take place in the intermediate phases, the same in physiological functioning, we have our final results coinciding with the laws of conservation of energy, and I would suggest mind is the result of certain hitherto unascertained intermediate action, especially that of nerve matter, that is the particular parts of organic structures where lecithin is present, and that curious material known as nuclein. We know that physiologically a minimum stimulus brought to an afferent nerve results in an efferent response of a maximum character. This would seem to show that the nerve structure acts as a "store-house" of force, probably accumulated during the metabolism of the organism, and in this way sleep is really the outcome of healthy development of toxins in the nerve matter, sleep acting as the antagonistic anti-toxin, the balance being equal at the waking moment; this of course has no reference as such to pathological conditions—which are abnormal.

To press this argument a little further, we have only to state that in any organism endowed with life, that is, metabolic processes, if the antitoxin is insufficiently produced to counteract the toxin, the result is death.

But this does not solve the problem of how or what this initial life really is.

If we take the therapeutic actions of drugs upon the healthy human organism we get no nearer a proper solution of the life problem.

"Life is mind." We will take, then, the organism completely anæsthetized, the physiological functionings go steadily on. Atropine, physostigmine, veratrine, or other drug may be injected, and we are certain of getting a well-marked known functioning of certain parts, muscular, glandular, or nervous, as the case may be. In a

word, we have life, but no mind, no volition ; how, then, can we support the statement that—

“ Life is mind,” and, conversely, that mind is life? Of course, as the action of the chloroform or other anæsthetic expends itself, mind and volition return and begin again to assert themselves in accordance with the individuality of the organism, and, in the case of man, personality follows on and begins to assert itself, but this is no proof that mind is present during profound anæsthesia.

Turning now to the principle of psychophysical parallelism in terms of the glands of the human body, we find here, perhaps, some of the best examples of the influence of mind over matter, and conversely matter over mental processes.

A gland may be defined as an organ of the body, the function of which is secretion, from which it follows part of the material acted upon by the cells of the gland will be by-products or excretions. Now every gland in the organism is striving for its full supply of blood ; there is, in fact, antagonism regulated by the nerves of these glands, which in turn may be controlled either by reflex action or by the fiat issued by the higher brain, and if one gland by super-activity obtains a greater blood-supply than its proper quantity, we get trouble in a pathological condition ; hormones, precursors, and enzymes are thrown out of balance, and we get a diseased state, either functional and transient or organic and chronic.

Mind, by influencing glandular secretion, does prove psychophysical relationship.

(1) If the pituitary body or gland fails to secrete, we get the individual with scraggy limbs and claw-like fingers.

(2) If a person unaccustomed to public speaking be suddenly called upon, he may get a dry mouth and parched feeling owing to inactivity of the salivary glands and the closing of Stenson's duct.

(3) If the thyroid gland fails to act, and pour its secretion into the blood, the person may suffer with inordinate deposits of fat, myxœdema, cretinism, or harmless idiocy.

(4) The thymus gland, large in the child, disappears in the adult, having served its purpose in regulating by its secretion the rhythm of the heart.

(5) The peptic glands and chief cells of the stomach fail to secrete properly under great mental activity.

(6) Worry, *i.e.*, mental strain acting by way of the liver and pancreas, checks the holding back of excessive sugar from the blood, and the person gets diabetes.

Puncturing the fourth ventricle or extirpation of the pancreas gives rise to the same abnormal condition.

These are only a few instances of the influence of mind over matter, but, upon the other hand, a badly working gland will influence mind materially; we have it in inactivity of the liver, clouded mind, and bad dreams.

There is no doubt in the higher organisms psychophysical parallelism is a fact, the mental processes or mind reacting and interacting with the functionings of the body; but what can we say, for instance, in plant life? Are we to designate the selection and devouring of proteid by the *Drosera* as the working of mind?

Shall we consider the carnivorous appetite and the secretion of digestive ferments as evidence of mind in the *Nepenthes*? It is in process a distinct response to stimuli, but there is no evidence of mind in the organism

as such, no volition ; apparently it is a thing apart from the organism itself, there is no evidence of complex ganglia or of brain, and we become reduced to the fact that life is metabolism—mind being something apart, yet running concurrently in and with the higher organisms.

Biologists, for want of a better term, call it the "Web of Life."

It is possible the lower organisms have mind in some form or other which I, as a scientific man, cannot understand, owing to ignorance and lack of power.

COMPARATIVE PSYCHOLOGY IN RELATION TO THE MENTAL LIFE OF THE CHILD.

How does comparative psychology throw light upon human mental life? is a question the answer to which is of the greatest importance for the study of the child and later that of sociology.

Beginning with the earlier forms of vital activities, as, for instance, in plant life or the Monera, we are in doubt as to whether mind, as such, exists at all. Whether or no there are distinct responses to stimuli, the stimulus in lower forms being light, heat or other mechanical phenomena, in any case we as men are pleased to term such chemiotactical or trophic. A little higher in organic development we say the creature or animal has instincts with which it is endowed at birth, expressed as due to heredity; higher still in organic evolution we say there is intelligence, in other words, a perceptual process whereby the animal from pleasurable results, due to "sensation," is tempted to repeat a particular action, perhaps many times, in this way forming habits; the whole process being due to experience in pleasure-pain values, the former repeated, the latter not repeated. This "pleasure value" is the method adopted in training animals, dogs, horses, &c., to perform tricks; the dog or horse is rewarded with a piece of sugar upon doing as instructed or castigated for non-performance, hence the pleasure-pain value is soon arrived at in sensation by the animal.

The lower animals do not learn by imitation in the

ordinary way, but by pleasure-pain experiences, yet with these there are the ingrained instincts born in every animal, and consequently we must look upon these instincts as the constantly repeated habits of previous generations, settled and made evident by response to stimuli in the nervous system of the animals possessing such instincts. Instincts, then, are ingrained habits passed on from one generation to another, the same response to a stimulus taking place for the particular environment under like conditions.

Instincts are automatic, or reflex, actions for the preservation of the species.

Taking, then, the child as no different to any other animal and looking upon it as the epitome of the race, we notice at the time of birth and before its own consciousness arrives, to be possessed of various instincts ; every child is born deaf, it cannot properly see but is capable of responding to the stimulus of light ; the greatest instinctive actions are to feed, that is suck, and to grasp with marvellous power and tenacity any object with which the hand comes into contact, instinctive action or behaviour, which is well seen and comparable in every way with that of the young of the monkeys and anthropoid apes.

The child at this stage is purely vegetative and objective ; about the third day the sense of hearing arises, actions to develop co-ordination of muscle motions become evident, about the seventh day after birth the child is adjusting itself to its environment ; in a word, subjective, it begins to know itself, and is then an individual to be reckoned with. It is at this stage that sleepless crying nights are in the making, everything practically either for good or ill depending upon the

methods of the nurse or actions of the mother ; the child begins to assert the will, if it finds it does not pay to cry—in other words, if it gets no reward for so doing, no pleasure value out of it—the crying operation is not repeated ; upon the other hand, if yielded to in every little matter, the will of the child dominates and we get a tyrant. The education of the child does not begin in the schoolroom as so many teachers seem to imagine ; it begins the moment the child is conscious of itself, its subjective stage.

Another important point in connection with the mind of the child is usually entirely ignored by all and sundry. I refer to its pre-natal stage ; it is assumed by many that all babies are the same in mind at birth, this is not so, it cannot be so psychologically any more than biologically, much is due to heredity both in potency and plasticity ; it is this latter the good teacher or educator seeks to influence, bringing the mind of the child into proper relationship with its environment, leading by suggestion, never attempting to force the situation ; it becomes evident, therefore, that “ formal ” training is a delusion and practically of no value educationally ; the duty of the good teacher is to make himself unnecessary, that the plastic mind of the child shall be led through its many savage phases to the development of ideas, until the educated can do without the educator. We come, then, to this stage of ideational process which, with proper nurture, may be prolonged into advanced old age, by proper activities retaining plasticity, and so improving not only the individual but the race, we progress from ontogeny to phylogeny.

Comparative psychology, therefore, helps us much in following and in endeavouring to understand human

mental life, because just as comparative anatomy with geological discoveries in old and primitive forms of organisms has given the clue to the formation and adaptation of homologous structures, reasoning by analogy and observing the general adaptations of present forms of life, we have in comparative biology the counterpart of comparative psychology, and by applying our knowledge to anthropology in connection with primitive and savage man, we are forced to the conclusion that the child is virtually a little savage, that the child passes through, in a shortened and modified form, the phases through which the race has travelled, indeed the child is the epitome of the race, both as regards pre-natal condition or embryology, and post-natally or psychologically.

What, then, is the significance of all this educationally?

It means that every teacher in every elementary school throughout this Empire should be acquainted with at least the broad facts ; if they do not know, they cannot be teachers of any worth, they fail to understand the child, endeavour to force knowledge into the child by rule of thumb ; the why ? they know not.

Every teacher knows that every child is a liar, but they do not know that savage man is also a liar, that the two phases are comparable, and that it is merely the desire of the child, as, indeed, with savage man, to tell you something which will please you, and concocts the most astonishing fabrications to satisfy that desire. A teacher knowing this would not brand the child as a liar and punish it accordingly, but by careful conversation cure the lying phases of child life. So, too, there are many other phases, such as playing with fire, and the formation of boy-gangs, hooliganism, &c., all, in fact, racial trait.

Comparative psychology tells us also that different methods may be adopted in the education of the child as compared with animals.

Animals are trained by pleasure-pain values, the child learns primarily by imitation ; this is a most important point, pleasure-pain values are also present ; but if the teacher as a model is wrong, so also will be the performance of the child ; we hear it continually in the raucous voice assumed by a child in imitation of its teacher, who perhaps is suffering with " relaxed throat " ; the Pigmies of Africa are comparable with the child in this respect, being splendid mimics of every civilized white with whom they come in contact, indeed, in this respect they are not far removed from monkeys.

An immense responsibility attaches to the teacher in this respect.

The nature and nurture of the young child demands abundant sleep, good food, and plenty of fresh air.

For educative purposes the child's interest must be awakened ; in a word the teacher must fix the attention of the child, for what indeed is attention but cognitive interest? Play is Nature's method of educating the child for the struggles of later life ; lessons, as such, should be short and sharp, or the attention will lapse, good results depend entirely upon retaining the interest of the child throughout.

A child should be trained in ethics and æsthetics immediately the subjective stage is arrived at, because, be it remembered, the customs of the people are the foundation of morals, and from the morals religions arise ; here, then, we arrive in the region of metaphysics, and comparative psychology ceases.

Comparative psychology teaches us, therefore, that

ideational process or conceptual phase is superadded in the case of human life, and that the lower animals do not arrive at this stage, but upon the other hand human beings still retain their instinctive natures. There is, however, no sharp line of demarcation between the instinctive, perceptual, and conceptual phases.

Comparative psychology, properly investigated, reveals ourselves to ourselves, especially in the study of childhood.

PSYCHOLOGICAL EXPERIMENTS IN CHILD LIFE AND SOCIALIZATION.

THE advantages and disadvantages of psychological experiment, may be briefly stated as to advantages, that by averages obtained by a large number of results from different individuals, the position may more or less accurately be arrived at of some particular family, clan, tribe or race, as compared with others, intellectually and especially in motor functionings, but to obtain results of any scientific value these experiments should be carried out by trained observers under like conditions ; failing the "trained observer," the amateur, being unable to properly interpret results, merely adds to the limbo of so-called scientific facts, really scientific fallacy, which now exists.

The essential point, therefore, is experiment by trained observers ; great advantages will then accrue, whilst disadvantages result from the converse.

Psychology, however, being the youngest of the sciences, it is doubtful if there be sufficient trained observers in the field ; it follows from this that for years there must exist a source of error, and the publishing of so-called facts which it may take a century to eradicate.

In any case, proper psychological experiments, recorded in an accurate manner, must of necessity ultimately improve our knowledge of the activities of mind, but unfortunately this is an abstract quantity, we can be certain of nothing regarding it, no two individuals are

alike, and the one judges of the other by his own capacity ; in the physical sciences we can predict a certain result from a certain experiment, but we cannot do so in psychological experiment, for, although the physical conditions of the experiment are apparently identical, we cannot be sure the mind of the same individual is twice alike, this applies equally to the experimenter as to the experimentee ; in a word there is no individual certainty, and an average result can only be arrived at.

Experimental psychology shows the limitations of at least human senses ; that all sensitiveness is not sensation ; that experience of phase or situation is never actually lost although *pro tem.* it may be forgotten, either covered up sub-consciously or ready to appear at the surface under abnormal or pathological conditions ; that genius is really only a modified form of madness ; that actually there are very few evenly-balanced minds, that all are more or less defective, that the most evenly balanced constitutes the "good all round man" ; that the unevenly developed in fact produces the idiot, the unevenly developed in fancy produces the unstable genius, either as poet or artist ; the so-called artistic temperament, unstable, spasmodic, never knowing what the individual will do next ; keen excitement, imagination, and pleasure, followed by frightful phases of depression. These remarks apply equally to the psychoses of musicians ; it would seem, therefore, these types are of the ultra-nervous character, the race-horse as compared with the cart-horse, the nimble and the lethargic. The keenness of mind in consumptives is perhaps due to the more rapid burning out of their physical frame, for consumptives are proverbially keen, clever and rapid in mental activities.

The chief disadvantage, in my opinion, in experimental psychology is, that there cannot be a proper means of testing each faculty because the faculties are complex, actually massed sensations, which need not necessarily be evident in motor physical activities, and therefore not actually measurable.

MODERN IDEAS REGARDING THE CHILD.

THE modern change in the conception of the child is, that from the old ideas that the child was from the first merely a miniature adult which required to be fed for the purpose of enlarging, and that all essential qualities were in the child, and these only required blowing out somewhat in the manner of charging a balloon with gas, has now given place to the fact that the child is in reality "the epitome of the race," that the child during its growth and development expresses more or less accurately the phases through which the race, of which it is a member, has passed, which means that we hold now the doctrine of recapitulation first advanced by Haeckel; the whole thing may be termed the discovery of the child. Here, then, we have an organism with certain inborn qualities due to heredity, which adapts itself slowly but surely to its environment, passing through the instinctive phases of animal life, together with the natural troubles and fears of primitive and savage man; boiled down, as it were, into the short period which we designate the growth of the child, showing us clearly, both physically and mentally, practically the whole of the phases through which the phylum has passed; we approach ontogeny, therefore, by way of phylogeny.

The child, from the moment it enters the subjective stage, is endeavouring to adjust itself to its environment by gaining experience. It is greatly aided in this by its marvellous plasticity; indeed psychologically, a child,

by imitation and adaptation, is capable of learning anything depending upon the examples set before it and the environment into which it is brought. For instance, I have a case in my mind at present where three children, the mother of whom is a Frenchwoman, the father an Englishman, the nurse German; these children from birth have been spoken to, and have heard other people conversing in French, German, English, Italian, Spanish, and Portuguese languages, with the result that each is capable of speaking in these languages, sometimes one, sometimes another, the youngest not yet knowing which language it is using, yet having the lot at its command.

What a blessing, indeed will this be when the children are of mature age; no trouble to learn, example, imitation and plasticity having done their work at the right time. These two last words are paramount, I mean "right time," because as the child becomes older it loses plasticity, and cannot learn so easily, and cannot so readily adapt itself to environment.

Now ignoring, for the time being, the physical or physiological phases, I refer more especially to the period of dentition, the "battle of the glands," the more rapid growth of bone as compared with that of muscle, and, later, the more rapid development of muscle as compared with bone growth approaching adolescence; and, confining ourselves to the development of mind, we get:—

- (1) The instinctive period.
- (2) The imitative period.
- (3) The attentive period.

There is no necessity for me to repeat the matter previously given, I will therefore confine myself to

some phases of child mind to which the term phobia may be applied, all more or less survivals of ancestry, animal, primitive or savage. We have, for instance, pronouncedly marked during childhood: The fear of darkness; the fear of solitude; the fear of being smothered; the fear of heights; the fear of orientation; the fear of eyes; the fear of ghosts; the fear arising from dreams; the fear of thunder; the fear of space; the fear of animals, which at a later stage changes to love; all of which tend to show the child epitomizes the stages through which the race has travelled due to heredity. Indeed, in the adult these instincts, although apparently non-existent, do not require much unearthing; we have atavisms of mind as well and as fully marked as form atavisms.

It is true that behind every bias there is fear, instinctive or otherwise.

CHARACTER AS THE SOCIAL UNIT AND THE PSYCHOLOGY OF THE CROWD AND NATION.

CHARACTER as the social unit is of importance, because individuality by way of personality is the main influencing factor in social organization.

Individuality is due to heredity, whilst personality may be looked upon as the little finishing touches given and superadded to the individuality by the person himself.

The psychology of the crowd is, therefore, dependent upon the units making up that crowd; the psychoses of the individuals will rule the actions of the crowd, whilst some strong personality will probably set in action or arrest the emotions, expressions, or movements of that crowd. Yet, upon the other hand, we find that otherwise steady and level-headed people will be so influenced by the actions of the mass, that they themselves for the time being will be carried away, and influenced to act in a manner which subsequently is regretted. It is in this way that panics are produced, fads run rampant, fashions are affected, crazes rush on, and public opinion formulates political action, engendering parties.

The actions of the child are perhaps purely selfish, but as adolescence is approached the selfish instinct gives place, at least partially, to a desire to benefit the race; an altruistic phase arises, the unification of purpose is for the common good, the individual selfish-

ness expresses itself in altruistic actions for racial benefit.

Character is the expression of individuality, personality and habit, and the development of these and their emotional values determines the individual social sentiments. There is no surer method for the development of good social characters than that of family life. The child at an early period is guided in the way it should go, learns the value of obedience, and adapting itself to the circumstances surrounding it, perceives the unselfish actions of the parents in sacrificing their own immediate comforts for the benefit of their offspring; gets the moral feeling, values of right and wrong dependent upon the customs of the family, reflected by the older members broadening out from the family to the clan, from the clan to the tribe, from the tribe to the nation, and so becoming educated by social functionings, and in this way education becomes socialization.

It is in this way the customs of the people give rise to morals, and from these morals laws are made, branching off, upon the one hand, and religions upon the other.

Laws, then, appear to take the attitude of compelling character, whilst religions endeavour to persuade character.

EDUCATION AND THE PSYCHIC FACTORS OF SOCIALIZATION.

THE steps by which the present national system of education has been built up have been gradual and in a measure coercive. Tracing the matter from mediæval times the period extends approximately over five hundred years; but it must be remembered the ancient Egyptians, Babylonians and Greeks had and exercised a system or systems of education which achieved most astonishing results both in writings of papyri and the more useful applied knowledge which we now term technics; the making of pottery with their glory of burnt-in colouring not to be equalled by the chemists of to-day, or, again, the building of the pyramids with absolute mathematical accuracy is an achievement which present-day engineers would not undertake lightly even with the improvements in machinery which now exist, the huge colossal figures unearthed and sculptured by the ancient Chaldeans strike us with awe and wonder, proving beyond dispute that education—perhaps not as we know it—had existed and could be applied four thousand years ago; undoubtedly it was a case of applied knowledge and as knowledge is of no value unless it can be applied, it seems to prove that much of our so-called knowledge to-day of boiled down facts is valueless and may be looked upon as mere cram.

John Knox in 1560, with his church discipline,

inaugurated elementary schools, and from these arose schools of a secondary type or grammar schools, from which students passed on to the mediæval universities, Oxford and Cambridge, which had been started by the Black and Grey Friars respectively. It is probable at this time the bulk of the students were drawn from the serf and agricultural classes, the fees were, comparably with later periods, low, and later class distinction in education had not yet arisen ; the fees subsequently were so greatly increased that only people of considerable wealth or affluence could attend or send their sons for the benefits educationally and socially arising from a University career ; however, be this as it may, we find John Knox and his disciples had so influenced education in Scotland that in 1633 matters were greatly in advance of England ; in fact, the level of education in England was not comparable with 1633 of Scotland until 1870—really two hundred and fifty years behind the times—and it was only in 1871 that the English Universities were open to Dissenters.

Education has at all times—even to-day—been bound up, and more or less controlled by, religious bodies, and we find in 1696 the Society for the Promotion of Christian Knowledge organized charity schools in which reading and writing were taught, primarily with the idea that people should be able to read the Bible.

During the Tudor period education facilities became less and less adequate and the Universities began to be chiefly attended by one class, especially after 1660. Henry VIII. also fettered education by appointing teachers with narrow views and by ordering that certain books only should be allowed,

with the object of influencing certain religious principles, whilst during the Restoration the schoolmasters were sectarian; consequently with monopoly came the tendency to stagnate; this, with education as other phases of life.

The factory system and education have run concurrently, especially with regard to child life; and even to-day we have in our elementary schools survivals of Robert Owen's "half-timers," and in 1782 Sunday schools were instituted for secular education to meet the needs of those who could not attend "work-days."

In 1816 the monitorial system of teaching prevailed, and one Joseph Lancaster organized a school for poor boys in the Borough Road in 1801, in which he undertook to teach large numbers to read and write in so short a time as three months by this method, which really amounted to teaching those who could not read by placing over them those who could read, the latter being called monitors.

This gentleman's efforts resulted in the formation of the "Royal Lancastrian Society," which subsequently gave rise to the National Society, which of course taught the tenets of the Established Church.

In 1832 a grant of £20,000 was made for educational purposes, and this really formed the nucleus for present-day work; whilst the Reform Bill of 1867, giving the franchise, paved the way for the further elementary education changes of 1870, whereby every child has to receive an elementary education. In 1885 secondary schools arose under Government auspices, and the Education Acts of 1902 and 1903 have still further facilitated matters so that a poor child may continue under certain conditions education to University Standard.

The main defect of the Education Acts is that all children attending our elementary schools are treated like "peas in a pod"; the teachers are bound by hard-and-fast rules, giving little or no scope for individuality; the whole system in its working is bound in red tape.

Other defects, not, indeed, of the Acts themselves, but in the working of them, are:—

(1) The overcrowded state of the schools with the accompanying vitiated atmosphere.

(2) The massing together of the clean with the dirty children, many of whom are verminous.

(3) The presence of "defectives," from whom other children learn filthy habits, tricks of facial contortions, and bad bodily postures.

(4) The presence of the very poor and dirty children coming to the schools practically starving, who upon arrival place their heads upon the desks and go to sleep, utterly tired out, who, the teachers tell me, are quite incapable in their condition of learning anything.

(5) That school attendance officers so impress upon the parents the necessity of the children to attend school under all conditions, that they frequently do so with infectious diseases, such as open tubercular glands, measles, scarlet fever, and, commonest of all, "ring-worm." The result is, the better classes will not send their children to the County Council or Board schools at all, and the inspectors seldom troubling to call upon the parents of children residing in houses rented above £50, these children escape the Education Acts, and in consequence frequently receive very little education of the school type at all.

Education in the proper sense implies much more than mental development. Physical training is the basis of human education, the morals of the children of the community are the outcome of the customs of the people expressing themselves in the ethical code and æsthetic ideals. There is no education in the true sense separate and distinct from the study of psychoses or psychology, and every phase of education, whether physical, mental, moral, or religious, is bound together, without line of demarcation, into our social fabric, almost imperceptibly intertwining and intertwined as part of the social organism.

In all matters of education, as with other forms of development, the later events or phases are conditioned by the earlier, and whatever comes within the conscious experience of the child in its sensitive plastic condition is there indelibly, nothing is lost ; it may become, as it were, covered up by that which follows in a sub-conscious state, there is a record in memory which is never effaced, and which will be recalled—when the proper button is touched. It behoves the teacher, therefore, to be very careful not to implant a false impression (record in memory) in the mind of the child, which will have to be subsequently unlearned.

The whole matter is ultimately a sociological one, it is educational sociology, actually social transmission in terms of tradition, folklore and custom.

The approach with the child is complex ; the heredity of the organism, in a word its instincts, coupled with the historical phenomena, the social phases or traditions.

These should be so guided by the teacher during development of the child, that by adjustment of the one

with the other the result shall be a social entity, a personality as distinguished from individuality, useful to the society of which it is a member.

Personality I would define as the little finishing touches added by the organism to its individuality, and which distinguish it from every other organism, mentally and physically.

The changes in educational method necessitated by the advance of psychology are, broadly, that no two individuals, no two children, are alike, either by heredity, physiologically, or mentally, and this at once demonstrates the fallacy and futility of endeavouring to cast every child in the same educational mould, pushing them all into the same groove, packing them with the same material, expecting them to absorb in like degree whatever is presented, turning out a mass of individuals like "peas in a pod"; in a word, the doctrine of "faculties" and formal training is wrong, and must be thrown to the limbo of "has been." Although there is still a vast amount of this so-called teaching going on in our schools, the more advanced teachers are endeavouring to break away from the groove codes, regarding educational matters from a rational standpoint, leading the child in place of driving it, keeping in view the objects of education, with especial reference to the child concerned.

What, then, is education in the sense indicated? The answer is evident, namely, development, as distinguished from growth, and adaptation.

We have seen previously that the child is an emotional animal, full of instincts, capable of responding to certain stimuli in a particular manner, and in addition a mass of potentialities due to heredity, which may be led in a particular manner by suitable example and

environment. The child is the epitome of the race ; animal, primitive and savage, condensed phases in the one organism, and through which it passes during growth more or less distinctly, culminating with adolescence.

The effect of genetic psychology is, therefore, to guide the intelligent teacher in the treatment of the child as it goes through these phases, taking them from an educational standpoint as they appear ; that is at the right time, it being useless to endeavour to manipulate at any other time, so making the best of the particular child being dealt with ; it becomes evident from this, the utter fallacy and absurdity of trying to cast all children in the same groove, in a word, to educate them in the same manner. Unfortunately this is what our so-called educational authorities are endeavouring to do at the present, and our elementary teachers are severely handicapped by the cast-iron Code rules ; the teacher being compelled to pack in a certain number of facts, which are finally pumped out of the the child before an inspector, or under the title of examination.

Education should be a leading out of the capabilities of the child adapting it to its environment, whilst knowledge is only of real worth when it can be applied. The individual packed with facts which cannot be used is valueless from the standpoint of socialization, whilst the person with ideas which may be converted into activities is the individual we want socially.

True education, then, is adaptation, an inflow or impression, record in memory, followed by an outflow or expression ; the two, in Herbartian language, are apperception, from " form to content."

In apperception there must be interest, attention is cognitive interest ; hence, in all education, attention of the educand is paramount, and the one main duty, therefore, of the teacher or educator, is primarily to fix the attention.

Froebel's method with toys in the Kindergarten was, and is, a means of fixing the attention, and is equally applicable, under varying conditions, to older children ; it is emotion or feeling converted into activity.

Apperception in another, yet radically, in the same sense, is to recognize a thing or situation which has been previously perceived ; but there could be no perception without an impression, expressing itself to a present state of mind in its own way ; hence education in the true sense is adaptation by way of impressions, expressed in terms of cognitive interest or attention, and recognized or apperceived upon again occurring. Then the mind of the educand adjusts these apperceptions, and associations arise by which memory is developed ; it is these associations and the development of the association fibres in the brain from the cerebral cortex, downwards and inwards through the sub-substance, the white matter of the brain, which is really the main factor in the education of the child. We find the greater the number of these association fibres converging, diverging, and surrounding the internal capsule of the cerebrum, which physiologically express the degree of culture of the individual.

To understand the child rightly we must approach its nature and nurture by way of physiology, anthropology and psychology ; by these means child study and education becomes a natural science, carried out by natural methods under natural conditions.

Subsequent to infant teaching and the acquirement of reading, writing, and simple arithmetic, I cannot conceive a more rational method of guiding a child in its efforts in gaining knowledge and experience than by play and the study of Nature and natural objects, especially by way of geography, because geography, if rightly and properly taught, is the introduction to the whole of the physical sciences, is the key to history, and the basis of commerce.

This subject, in my opinion, is useless if taught in the old-fashioned way by means of flat maps, lists of counties, rivers, and mountains, all to be learnt by the unfortunate children by rote.

Geography should be made a live, interesting subject, using contour maps with remarks upon the character of the soil, the plants and animals found in the locality, the natural products of the district, their use in commerce, and in addition, the history of the area, and characters of the peoples inhabiting the part. In this way a firm, broad foundation would be laid in the child mind for the concrete sciences later, in dealing with particular classes of facts and their co-ordination in botany, biology, geology, &c. ; and yet, further, the abstract sciences will be introduced in terms of mechanics (physics), astronomy, and mathematics, in which hypothetical constructions have to be made by reference to ideal standards, and thus the normative sciences come into play in terms of logic, æsthetics, and ethics, in which standards of judgment are set up, the superstructure of the whole being the practical sciences, as medicine, architecture, and rhetoric, in which the standards of judgment are applied to the formulation of the principles of action, this is true education and socialization ; interest

is created at the outset, attention is fixed, the one thing leading on to another, the vastness fascinating, yet appalling in detail, until the child has passed to adolescence and manhood, probably obtains a degree, and still realizes that the fringe of the subjects has only been touched, that the founts of knowledge still pour forth their waters, and that he has only taken a passing sip ; and so on to the end of life.

In the teaching of children three grievous errors, among others, appear to me to exist in our school system : in many cases the classes are too large for proper instruction ; the children are given *mental* arithmetic before they are capable of visualizing, in some cases prior to concrete examples, immediately upon being removed from the infants' class : this points to the fact that many of our elementary teachers fail to understand and appreciate the child psychoses ; a child in ordinary finds great difficulty in visualizing, and frequently cannot do so at all ; indeed, adults cannot all visualize, and very young children should not be put to this unnecessary strain and dubbed dull and incapable unless they have been previously taught by concrete examples.

The third error is in the teaching of English ; the children are taught to spell by rote, and insufficient advantage is taken of giving dictation, which is of great mental value to the child between the ages of eight and twelve years in laying a solid foundation for later composition, the teacher frequently giving the exercise far too quickly, and badly articulated ; the result is disaster to the child's caligraphy and bad pronunciation of words in later life ; again, in singing, which should be a sweeter way of speaking, how often we hear a shocking "nasal

twang," words which are not words, altogether non-understandable, devoid of expression, and voices like a rasp.

Every child should be trained first by imitation under a good model to sing and recite individually and publicly before its class in the school, and later to read clearly and distinctly, with proper expression and voice cadence ; we should not then hear in later life the mumbling monotone, devoid of all dramatic expression, generally called reading ; further, in reading the various authors comprising literature, the grammar, parsing and analysis should be of secondary consideration. It is in this way children are made to dislike our most sublime and poetic authors, the whole mass being looked upon by the child as a corpus vile of syntax and analysis. The great point in education is to fix attention, create interest, fire the imagination, raise ideas, build ideals, create, as it were, a living soul. Rousseau with Nature, Froebel with toys, Herbart with apperception, Spinoza, Pestalozzi, have all striven in different ways for virtually the same end ; it is not my business to discuss the merits and demerits of these methods, but I must insist upon the ingratiating of a love of reading in every child as a means to culture, and such reading as articles upon mediæval times and the suggestions of the late Dr. R. D. Roberts in utilizing our public libraries for more serious study than at present, are steps in the right direction in influencing the culture of the masses.

The Professor of Education in the University of London, in his work, "Herbartian Psychology," has said in reference to the average teacher and schoolmaster in our elementary schools : "He is content to practise an art the principles of which he does not understand, and he haughtily resents any attempt to enlighten him."

This coming from a man in the position of Professor John Adams, with so broad a mental horizon as evidenced by his lectures upon ethics, is a serious accusation, and the training of teachers is safe in his hands; the omen is good for the children and their education in the future.

MALTHUSIANISM IN RELATION TO CHILD LIFE AND THE NATION.

THE influence of Malthus and the validity of his theories upon British legislation and administration are still at work, and at the time when these theories were propounded the doctrine undoubtedly tended to check reform. His statement was that the population tended to double in twenty-five years, but that the means of subsistence did not increase in the same ratio, *i.e.*, that while the increase of the means of subsistence is in an arithmetical, the increase of population tends to be in a geometrical ratio. This led him to consider checks to population, and this subject has occupied the minds of thinkers from the days of Plato and Aristotle. He considered the matter from the positions of moral restraint, vice, and misery. The positions of vice he rejected, that of misery he endeavoured to reject by inculcating the necessity of moral restraint. His theory teaches that parentage involves great responsibilities, and that it is immoral to bring human beings into the world unless there is a fair prospect of being able to properly provide for them.

There is no doubt population sometimes tends to increase beyond the means of subsistence, but Malthus was wrong in his statement of the geometrical ratio.

This, of course, is a social problem of the utmost vital importance. Let us look at it from varying stand-points :—

Firstly : Is the world too small for its population ?

My answer is unhesitatingly No ! It never will be

so long as human society exists ; the great fault of human beings is, that they congregate far too much in definite areas, and that if human society were properly dispersed throughout the *habitable* areas, there would be more than space for all, and by pasturage and agriculture, mining, transport and work, a full subsistence for all could be obtained.

Secondly : Are artificial checks necessary—that is, moral restraint—or will natural checks effect all that is necessary ?

The propagation of one's species is the essence of life, it is the biological ultimatum, and I submit, therefore, artificial checks or moral restraints are either or both unnecessary, provided natural conditions be observed, but the evils of civilization have rendered these checks necessary ; in a word, we are living under false conditions, hence the misery of the whole thing.

Whether we turn to plant or animal life, the fact stares us in the face, no artificial checks or moral restraint is exercised, natural selection and environment do the work in the most perfect manner possible, and it is only when man interferes that the fallacies and failure of the organism, the individual or society, fails to subsist. Darwin argues that if a certain plant developed all its seeds and these in turn developed all theirs, through only a few generations, every other organism would be crowded out and no space would exist for any other form of life ; this may be so, but we have to consider what may be termed natural checks, namely, one organism preying upon another, be they plant or animal. We have this well exemplified with the carnivora and ruminantia in their natural conditions ; with stoat and weasel in relation to small rodents ; the destruction of

the ophidia by the mongoose ; whilst overcrowding or unnatural conditions gives rise to pathological conditions, wiping out immense numbers with one blast of the epidemic ; in plant life we get the same kind of things ; mucedo never exists naturally without penicillium glaucum ousting it and finally taking its place, whilst overcrowding of the higher plants, phanerogams always results in a sickly development, and the consequent incursion of fungoid growths which rapidly devastate the plantation, garden or forest.

Darwin, if I remember rightly, states that the number of humble bees depends upon the number of spinster ladies, arguing that old maids keep cats, that cats catch field mice, that field mice despoil the bees ; hence the connection.

So it is through the whole web of life, and there is no living phase in which bacteria are unknown, whether friends or foes, and especially in human social conditions these infinitesimal organisms count for much ; and I submit then, that artificial checks, to restrain population, are not necessary under natural conditions.

Bacteria during their life history produce ptomaines, toxins or substances, which finally kill the organisms.

Yeasts are destroyed by the products of their own vital activities—alcohol.

Zymogens give rise to ferments which result in cessation unless the products of their activity be removed ; Nature never makes a mistake, there is always cause and effects.

Our true remedy in expunging this social canker is extended space, *i.e.*, normal natural conditions.

Thirdly : Who are the chief propagators in our British social life and the effects upon our Nationality ?

The whole matter may perhaps be summed up as a study in National deterioration. Briefly it is to argue out by practical experience and original research to what extent the fall in the number of children in English families is differential.

To what degree is the reduced fertility of English wives associated with social status, with conditions which mark poverty, disease, or general unhealthy and improvident surroundings.

Years ago it was shown by Pearson that 25 per cent. of the married population produce 50 per cent. of the next generation, and this conclusion has recently been confirmed by Powys. Hence it becomes necessary to ascertain whether that 25 per cent. is the better or worse portion of the community.

There is no shadow of doubt it is the artisan class which contribute the largest relative number to the population.

General prosperity and culture are connected with a low birth-rate, but they are hardly less important in their social significance. Where the labour is of the lowest type, and where poverty leads to the pawn-broker's, and forces the child at the earliest possible age into employment, there the married women have the most offspring. The worse the sanitary conditions under which the people live, and the worse their physical and mental health, the higher is the birth-rate. Another curious phase of social life is that cancer, culture, and a low birth-rate seem to go together.

It is doubtful if there is any better measure of the undesirability of a class and its unsuitability of reproducing its kind, than the extent of the infantile mortality within it. In districts where there is overcrowding,

where there is a superabundance of the lowest type of labour, where it is needful to employ very young children in order to earn daily bread for the family, where infantile mortality is greatest, there the wives of reproductive ages have most children. Upon the other hand, where there is more culture and education, more leisure and comfort, as shown by the presence of domestic servants, there the birth-rate is least.

In fact the relationship between inferior status and high birth-rate has practically doubled during the last fifty years, the size of families has begun at the wrong end of the social scale and is increasing in the wrong way, which means National deterioration.

The higher birth-rate of the undesirables is not compensated for by the higher death-rate.

In this connection Dr. Gilbert Slater says :—

“I very much doubt this. In working in connection with the recent unemployed Act, I was very much struck by the smallness of the families among the unemployed—due, of course, rather to high death-rate than to low birth-rate.”

Again, in the middle classes marriage is postponed frequently until middle life, and it becomes a question whether the children of old men are as good national stock as the children of younger ; the whole subject is of immense importance nationally, and the side issues wither one's arguments with their extent.

Again there is the question of heredity to be considered ; physical and mental characters, tendencies to health and disease, intellectual and manual capacities are undoubtedly inherited.

The much debated question of acquired characters denied by Weismann, supported by some and refuted by

others, I will not enter into, further than to say, that if by habit and education new manual and mental proclivities were not transmitted to progeny, whereby they individually might acquire the more easily the adaptability for life's functions and work, then I say education and strenuous effort for self-improvement would be valueless to the race: and further, what of the vast geological epochs in developing new organisms by acquiring characters according to requirements in response to environment and needs, unless indeed we assume an especial creation, which the established facts of embryology fail to support.

Many of the points which I have touched upon, would to the narrow mind appear very remote from Malthusianism, but I submit are side issues of National importance.

I have for thirty years made an especial study of bio-chemistry, and feel bound to admit the intricacies of the web of life are unfathomable, and that sociology based upon mechanics or physics, followed by chemistry, built upon biology, surmounted by psychology, united with sociology, cannot be fully understood or appreciated by the mind of man.

DARWINISM, WEISMANNISM AND MENDELISM IN CHILD LIFE AND HUMAN SOCIALIZA- TION.

DARWINISM, the theory of Weismann, with its present day modifications and the applications to every-day life, together with the proofs of a more or less definite character shown by the experiments of Mendel, and their further applications in the breeding of pure stocks, the hybridizing to obtain new varieties, and the ultimate application of the phenomena to human life and the social organism is so far reaching and appalling that one hesitates either to support *in toto*, ruthlessly criticise, or condemn.

Twenty-five years ago it was my privilege to be a pupil of Professor Huxley, and I remember the arguments extended by this marvellous biologist were sufficient to shiver the timbers of any objector, but since that time our views have become modified ; let us look if we can in a calm, critical manner into the main points of the matter.

Darwin's "struggle for existence" is now expressed by the popular mind as Spenser's "Survival of the Fittest," but however expressed we have it exemplified that organic progress depends primarily upon variability ; but what is the origin of these variations ?

It will not be necessary here to take up the recurring facts of embryology, but to look only at the causes of variations. We know by the study of the maturation of the ovum, and the extrusion of the polar bodies, we

get a certain number—varying with each species—of chromosomes, and that these are said to be the carriers of the hereditary principles, after fecundation of the ovum or germ cell by the sperm cell; it would seem obvious that the casting away of these polar bodies during maturation would be with the object of making room as it were for the sperm cell to interblend and intertwine so that the hereditary principles introduced by it might grow and develop side by side with those previously present, hence it would follow the resulting organism would partake partially of the nature of one parent, and partially of the nature of the other, and further that the stronger principles would tend to override the others whether developing into bodily form or mental capacity. This is practically Darwin's position, and as expressed by the man in the street the child is said to be "a chip of the old block," which is true; but Weismann has propounded the theory of "Germinal Selection" by which he states the probable cause of variations is due to the fact that the cells of the growing organism during development are as it were competing for food supplies, and the cells which from any cause whatsoever obtain a larger amount, will develop the best and form an organ or "faculty" more pronounced than in cases of poor nourishment, and thus variation is produced; but in my opinion he fails to see, or at least seems to take no notice of the fact that you cannot make something out of nothing, and that unless there was present some innate power (hereditary tendency) in the cell it would be impossible to develop it.

Further it has been argued by Weismann that certain cells of the primitive embryo are, as it were, separated off from others (which go to form the body or soma)

for later reproduction purposes, that these are thrown off at the proper time, and have as it were lain dormant during the interval, and that therefore the offspring or child will have none of the characteristics of its immediate parents; this must be fallacious upon the face of it, otherwise there would be no progress in organic evolution but merely continuity; which we know by observation to be established fact; in addition he apparently takes no account of the nourishment conveyed to the growing and developing embryo by way of the blood stream of the mother; he fails to perceive the blood is a connective tissue, and that every cell of the primitive developing embryo is produced from a similar cell, and that therefore this connective tissue being produced by the mother, and built into the cells of the new organism, would impart to that embryo more or less the characters of the parent, and I submit this is probably the reason that badly nourished mothers produce more boys than girls, and would account for the fact that boys are more difficult to rear than girls; the boy starts life as it were handicapped by his prenatal conditions; it is a fallacy also to state that man is the stronger as compared with woman. Women are constitutionally stronger in every way, can bear more pain and greater privation than men.

Weismann's theory has, however, opened up a question in my mind which for years I have endeavoured to prove or negative by direct experiments. I refer to the cause and contagion of cancer; there are, of course, many kinds, but I allude to those of a malignant type.

My premise was this: We know in hydra that the cell destined to form the ovum is parasitic, and that the

cells around this cell become trophic to it, they are devoured by this parasitic cell and the egg cell is developed at their expense. Further, this egg cell is developed and nourished entirely from one layer only of the hydra, namely, the outer layer, the ectoderm; this would seem to support Weismann's theory of the setting apart of certain primitive cells for reproduction purposes, and I submit, although it is a long way from hydra to man, that such may be a survival from ancestry, and in the pathological conditions which we know as cancer, the bulk of the cases occurring in middle and later life, that is, when sexual desire is waning, is it not possible that a reproductive cell somewhat resembling that of hydra gets into the blood-stream, is not destroyed by the phagocytes of the blood, settles in the tissues, acts as a parasite, compelling the trophism of the surrounding cells, thus destroying and living upon the parts in question, sending out thongs more and more extensively, the toxins produced during the process being carried by the blood-stream to other parts of the body, giving that curious indescribable characteristic appearance so typical in patients suffering from this disease. I have failed to discern any characteristic micro-organism in any case of cancer, but almost every case may be transplanted to mouse or other mammal by hypodermic injection. It is generally remarked cancer follows some kind of irritation or blow; this would still further support this view, the surrounding cells, owing to injury, the more easily degrading, becoming trophic to the parasitic cell.

Further, I submit the quality and character of the maternal blood is of the utmost importance in human heredity. The difference in the smell of freshly-drawn human blood seems to indicate there is a difference in

constitution between races and individuals which cannot be detected by chemical tests or physiological phenomena. It is not a matter of excretion but a constituent part of the blood to be finally built into the fabric of the finished organism, hence hereditary tendencies. In addition, the principle of transfusion of blood shows that there is a difference in mammalian blood which cannot be detected chemically or by any other means than experimental physiology.

The principles of Mendelian inheritance have not as yet been applied to human life, but it is an established fact that "breeding true" among dogs, cattle, horses, pigeons, and poultry has been achieved; that selection by this system has resulted in a permanent type of double-grained wheat of especial flour-making value, various specimens very resistant to the attack of uredo and other forms of "rust"; yet with all this and other results in epi-phenomena there is still the tendency to "sport," or revert to that from which the organism originally came, which proves the innate subtlety of inborn characteristics or hereditary tendencies, however much they may be covered up for a time by characters acquired by cultivation. Galton, with his eugenics, endeavoured to apply all this matter to human life, and to show by composite photographs the typical face and expression of a child by piecing together the features of the parents, grand- and great-grandparents, and in many respects he has been singularly successful, especially in the case of consumptives, proving again these hereditary tendencies are inborn and transmitted from remote to succeeding generations.

Hereditary tendencies are of the utmost importance in social life, but I submit improvement of the individual

and indirectly of the social organism, will take place, not only by controlling these tendencies in breeding, but by furnishing suitable environment. The whole subject is one of the principal problems in developing childhood, and the ultimate improvement of human society.

It appears, however, while cross-breeding, hybridization, and so-called pure culture result, yet given certain conditions there is always a tendency to revert. In carrying out some research work some time since I found with regard to the prepotency of pollen and its influence in cross-fertilizing for the production of penstemon—this plant being virtually a cross between *digitalis* and *antirrhinum*—the microspores of the former being used to pollinate the macrospores of the latter, the seeds produced what appeared to be a stable definite variety for three generations, but “sports” subsequently arose and complete reversion took place in the seventh year, proving that the ancestral strain was still present.

Similarly in hybridizing the colours of the hollyhock—*malva rosea*—the yellow-cream and white varieties finally revert to the original purple if left to themselves, whilst the chemical constituents of the soil influence the floral colours materially.

The same holds good with the leguminosæ, *i.e.*, sweet and everlasting peas. Further, cultivated fritillaria finally reverts to the beautifully mottled wild variety.

Colchium autumnale may be crossed with other liliaceous plants, but revert subsequently.

In the animal world we know the mare, equus, sired by the donkey, produces the sterile mule, &c., and one of the most fathomless problems of the day is how the varieties of dogs originally arose.

The questions concerning heredity, and they are many, have not yet been fathomed by man, and it remains an open question when and how they may be applied to the human species in perfecting sociology. Two things are certain, evolution is taking place, influenced by hereditary tendencies and environment, but the phase rule is not yet known biologically.

EVOLUTIONARY DOMESTICATION AND CHILD LIFE.

THE influence of modern theories of evolution upon domestic legislation is broadly that child life from nativity onwards is looked upon as the chief asset of the nation, and as such every available protection is extended to the child, if possible, and where practicable by way of the mother, either by necessary food or instructions in the better methods of developing childhood.

The main reason for the greater care of infants during the past quarter of a century is probably caused by the steady decline in the birth-rate since 1876; this decline has taken place not only in England but throughout Western Europe. It may be remembered by many of us, the number of children in well-to-do families in England used to be six or seven, but now this has fallen to three or four at the most: the reasons for this may be various, such as want of means, the greater competition in earning an adequate livelihood; the objection of the women to be burdened with the cares of child-birth and the bringing up of large families as interfering with the social pleasures of every-day life, and the thought of what is to become of the progeny in after life, should the parent or parents be removed prior to the child reaching adolescence, the difficulty in providing suitable education and giving the children a fair start in life, and many other factors too numerous to mention; so that the middle classes have practically solved the problem

for themselves by having fewer children and endeavouring to provide for these children in a more efficient manner; but whichever way we look at it, there is no doubt that marriage and family life, high or low, rich or poor, is really the fundamental principle, the backbone of the nations; it therefore behoves the State to foster family life, and where the parents fail, to step in, legislate and provide methods and material for the defence of infancy and childhood. France is in advance of England in this respect and has acted as the pioneer for taking care of infants.

With the object of sustaining infant life with proper development, milk depôts, under cleanly conditions, in which the milk obtained from cows is analyzed as to total solids and percentage of fat and subsequently modified* or humanized by the addition of water, sugar of milk, &c., administered by means of sterilized boat-shape bottles, is a step in the right direction inaugurated in France, now copied in England and the United States, together with crèches, perhaps a dangerous development, for the care of the babies of working mothers, point to the fact that the State, by way of the municipal authorities, is alive to the benefits to be derived by fostering in comfort and health the infants destined to form the coming generations; with fewer children greater care must be taken of them. It will be noticed I have mentioned sterilized *bottles* and not sterilized milk, the reason being that in practice it has been found sterilized milk is not readily digested by infants and has not the full nutritive value, owing to the absence of living bacteria which are of especial

**A few drops of Phillips' Milk of Magnesia added to the milk prevents the formation of curds.*

use to the infant alimentary canal in this respect; further, the addition of preservatives to milk whilst obviating evident putrefaction does not prevent decomposition and the formation of albuminates not readily assimilated by infant life, hence milk treated with boric acid, borates, formalin and other so-called preservatives should not be given to babies; if administered, inanition results, the enzymes of child life being insufficiently active to cope with the matter. Kittens fed upon borated milk die upon the average on the seventh day, this has been repeatedly proven experimentally; goats' milk, donkey's milk, mare's milk and koumiss are all unsuitable in some respects to maintain and nourish infant life, and should not be used excepting under abnormal conditions. Again, cane sugar in infants' foods is a continual source of trouble; if sugar must be added, lactose should be used and starchy or "prepared" foods should never be administered until the eruption of the first dentition, otherwise gastric troubles occur with infantile diarrhœa, due to fermenting undigested material in the intestines. Infantile diarrhœa is also traceable to "flies in the sugar-basin"; hence the prevalence during the summer accounting for many more deaths than pulmonary troubles and bronchitis during the winter.

In any case, with the care now in evidence, infantile mortality is decreasing, and the huge number of previous deaths during the first year of life is becoming obviated.

It has been said: "Country milk is sent to town and in consequence none is available for country children"; this only applies to country places near towns and easy of access to and from railways; in the Midlands there is a surplus of milk which is frequently used

to feed pigs, because the cost of carriage is more than the milk will fetch in the towns.

Another important point in the rearing of babies and children, generally ignored by most people, either from ignorance or lack of thought, is the passage of heat from the surface of the body; hence the necessity of warm clothing which will not hamper the activity of the limbs.

For some time past I have seen in Germany healthy-looking babies sitting in panniers upon the back of grazing cows being fed by teat and tube connected with the cow's teat; this, in my opinion, is objectionable, because of the difficulty of properly cleansing and sterilizing the length of tube required for the purpose, and in addition the milk is not quite of the character required by the growing infant, with consequent waste of energy to the infant organism in dealing with the excess, although this is partially compensated for by the rightful temperature at which imbibed.

One of the main social problems is, what to do with children between one year old and the time of attending the ordinary elementary infants' school—must the State accept the responsibility in continuation of its milk depôts and crèches?—if so, what would be the better method of dealing with a number of infants, say between one and five years of age? I suggest a good plan would be to utilize the parks and open spaces of towns for the purpose, where the little ones left by their respective parents might be taken care of until fetched away again daily, much in the same manner as attending school; during fine weather the children playing upon the open grass, during wet weather under open-air shelters built without sides or walls, so that free circula-

tion of air may take place, batches of not more than five little ones being in charge of older girls, about fourteen years of age, from the surrounding schools, who having been previously taught how to act and amuse with profit the activities of these infants, so that play should be the chief means of teaching, the elder setting the example and the younger imitating: clay modelling of flowers or animals, sand castles, action of water upon the soil, birds, fish in the ornamental waters, and scores of other natural objects, trees, and stones, might be made of educational value with lasting effect upon the health of the youngster for good, the elder girls reaping the benefit by the training and experience involved for their subsequent careers in their own families.

One of the greatest difficulties in carrying out such a scheme would be the feeding of the children, but as 60,000 school children are now being fed by the London County Council, the matter should not be insurmountable. A point arising from this might be that a certain class of woman would seek to shirk her responsibilities as a mother; individual effort would be lost in such cases unless means were adopted to compel a proper feeling in motherhood.

The taking of children into the country for one day's pleasure is not of much real value from a health standpoint, although as an educational factor it is of value; the day is too long, the experience too exciting, the child becoming too tired, the detrimental effect upon the nervous system being greater than the benefit derived from breathing country air: however, there is no good thing without its drawbacks, and a day in the country for children is better than slum life.

The Education Act of 1907 now provides for the

medical inspection of school children, and much good work is carried out in this respect in suppressing "ring-worm" and the verminous condition of some, whilst the sight, hearing, and condition of teeth, are points receiving attention. The presence of adenoids, as affecting the mental condition, is of the greatest importance. The lack of power to concentrate the attention ; the detection of those happy monstrosities known as the "smilers" ; the continued phase of echolalia pointing to defective mental condition from an educational criteria are now dealt with medically, although many practitioners are sadly incompetent in dealing with child life—five years' training is insufficient to deal with all points of the compass ; yet great improvements have arisen within a comparatively short time, both teachers and medical men taking a greater interest in understanding the peculiar phases of childhood.

The physical development in childhood by culture should aim not at feats of strength, but symmetry of form with proper graceful movements, correcting disparities and the toning down of evident defects, increasing nutrition by properly exercising every organ and limb of the body, and, above all, children between the ages of five and twelve years should be taught to breathe properly by way of the anterior and posterior nares, and not through the mouth, the chest capacity being developed by gentle exercises of the proper kind, the Swedish methods being certainly the best, because the chief aims are both physiological and educative, giving style and precision, muscular strength, quickness, and self-control ; with these exercises the influence upon the child is immense in growth, function, and intellectually.

In every case, however, with children, care must be taken to stop long before the "fatigue" stage, that is,

in all exercises, whether for body or mind, the lesson should be short and sharp ; a child quickly fatigues with every form of activity, and in teaching it is impossible to fix the attention of a child for more than twenty minutes at one kind of activity, hence continual change is paramount in educating children. Physical exercises should, if possible, be carried out in the open air, the correlation of neuro-muscular activities resulting in the better functioning of the muscular, digestive, circulatory, and respiratory systems ; yet well co-ordinated, this should be the main object.

Children learn by play how to cope with the subsequent duties of life, and if we notice groups of children at play in the open fields, we find they run hither and thither spasmodically and rapidly, suddenly turn and stop : this gives the very keynote for the treatment of children in physical culture, the exercises should be "short and sharp," or fatigue quickly supervenes, there should not be trials of strength to test endurance in the physical culture of the child.

Early physical education is really the basis of all subsequent human activities, mentally and morally, and should be adapted to the peculiar needs of the sexes and the mental capacity of the individual to be trained.

Every form of education depends upon the development of the nervous system ; growth and increase in weight are regulated by it, and plasticity of nerve-matter, sensory and motor, is conditioned by early and sustained physical culture, hence the necessity of abundance of sleep during infancy and childhood. Again we are reduced to the three main factors for the proper conditioning of child life : adolescence and adult periods, of good food, fresh air, and plenty of sleep.

VALEDICTORY.

It may be said that so much embryology and physiology as that narrated in the preceding chapter has little to do with the social and industrial history of the nineteenth century, but I would submit that Darwin was the first to suggest certain phases of infant life, and that the proper study of the child and childhood has arisen from this fact, and that such study has developed entirely during the nineteenth and twentieth centuries; further, that the resulting influence upon social history will in the future be looked upon as one of the greatest national assets of the nineteenth century concurrently with the study of child psychoses in education.

The nation now realises the children are its greatest asset, hence the latter portion of the nineteenth century, and so far the twentieth century, have been productive of various regulations for protecting the child in all matters affecting education: Medical inspection of school children, the Employment of Children Act 1903, the Children Act 1908, and the National Society for the Prevention of Cruelty to Children, founded in 1884, this latter being of a more or less voluntary character, having the following objects:—

(1) To prevent the public and private wrongs of children, and the corruption of their morals.

(2) To take action for the enforcement of laws for their protection.

The children's section of the Society is called the

"League of Pity," instituted with the object of interesting happy children in the welfare of the unhappy.

In this matter of social child life, public opinion was in advance of the law, and the so-called "Discovery of the Child" is one of the greatest feats of the nineteenth century and far-reaching in national importance, social complexity dependent upon child complexity, and that which the coming nation requires must be by way of the children.

Physiological functioning is the life of the child and the functioning of the race is the sociological problem, the one dependent upon the other.

Professor J. Arthur Thomson, in his address delivered before the British Association for the advancement of science, upon "Darwinism and Human Life," has shown, in a very forcible manner, the great influence exercised upon industry and social history by the application of Darwinism during the nineteenth century to the affairs of human life.

The methods adopted in so complex a study as that of child life depend upon the end in view, but in all cases, and for whatsoever purpose, the approach must be made by way of anatomy, physiology, anthropometry and psychology, and each must receive a share of attention.

Psychology has formed the centre of chief interest, partly because in the activities of children we find the simplest expression of the human mind, and partly because of the special difficulties involved. Psychology being the youngest of the sciences and a product of the social history of the nineteenth century (indeed, prior to the psychological conceptions, the child could

not be adequately studied), I submit, therefore, the researches in embryology, physiology, anthropology and psychology of the nineteenth century have resulted in a better understanding of the whole social history of the nineteenth century and its application to industry. Psychology, as the working of mind, is productive of thoughts; thoughts give rise to activities, which has been well exemplified in the psychology of the crowd during the present "labour troubles"—the strikes. To the able and the broad mind it is not necessary to labour this point; by it and from it the child of to-day is in an infinitely better position to any previously recorded in our history, and, as a consequence, we may look for better social conditions in the twentieth century, with higher conceptions and better treatment by education in human life.

I submit, therefore, the bulk of the researches have been made during the nineteenth century. The results applied to the phases of childhood in their respective social environment, permeating every condition of social life, improving social conditions both historically and industrially, thus contributing to the social and industrial history of the nineteenth century.

Mr. FREDERICK DAVIS *may be consulted by appointment upon all matters relating to Childhood and Child-life.*

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(1) *Mrs. —, mother of twins, anæmic and weak, breasts soft, and milk of poor quality. The infants were starving and continually fretful. "Lactagol" was administered with most gratifying results; upon the second day the quality of milk improved, the infants' crying ceased and they became well nourished; breast-fed until the fifth month. Percentage of fat in milk before and after administering "Lactagol," 1·79 and 3·8.*

(2) *Mrs. —. Secretion scanty, baby suffering from inanition. "Lactagol" given over a period of fourteen days, quantity and quality of milk improved markedly, baby well-nourished and breast-fed until the seventh month. Before, 1·48; after, 3·4.*

(3) *Mrs. —. Mother tuberculous, milk abundant, but of poor quality; infant badly nourished. "Lactagol" administered three times each day resulted in rich quality secretion; baby (a boy) well-nourished and breast-fed until the eighth month. Before, 2·2; after, 4·45.*

(4) *Mrs. —. Very young, mentally defective; milk poor. Infant small, failed to grow until "Lactagol" was given to the mother.*

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Vide THE LANCET, March 30, 1912, page 897, "Pneumosan as a Remedy for Tuberculosis," and leading articles of the MEDICAL TIMES, Sept. 30, 1911, page 761 et seq. "The Pneumosan Treatment of Pulmonary Tuberculosis."

Dr. C.—, M.B., B.C.(Cantab.), writing from the Colony Hospital, Grenada, B.W.I., under date July 8th, 1912, relates the following

CASE OF ACUTE TUBERCULOSIS RUNNING A FAVOURABLE COURSE.

S. G. F.—, 20 years. In February, 1912, was seen and complained of persistent hacking cough, occasional slight attacks of hæmoptysis, and night sweats with fever.

EXAMINATION.—Crepitations over apices of both lungs. Small cavity formation at left apex. Sputum teeming with tubercle bacilli.

TREATMENT.—Pneumosan injections started at once with the doses recommended. Microscopical examinations of the sputum were done every ten days. After first series patient's general condition somewhat improved. Tubercle bacilli were as before. In March a second series was commenced, the doses used being 10 minims for the first five doses and 15 minims for the second five. The physical signs in the chest were less easily made out and the T.B. were lessened in a marked degree. Cough still present. No hæmoptysis. In April the third series was given, the doses being as in the second series. The general improvement was maintained, the cough less troublesome, and hæmoptysis absent. The physical signs were less apparent. T.B. were present in steadily decreasing numbers on each examination of the sputum. In May a fourth series of injections was given, the dose given at each injection being 15 minims. Under this dosage the patient greatly improved, and all the physical signs disappeared, with the exception of some dullness at the left apex. There was no hæmoptysis, and little cough, no fever, and no night sweats. The sputum still presented T.B., but in very small numbers, and it was necessary to search seven or eight fields before a single bacilli was found. The case has been remarkable throughout, and shows a rapidity of improvement which I know of under no other treatment.

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